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Vol. 1054 Number 2

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

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May 14, 1985

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 14, 1985 Volume 1054 Number 2


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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
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GENERAL INFORMATION concerning TRADEMARKS.

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# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1052 O.G. 52 on Mar. 26, 1985.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Domestic PCT fees were increased on Oct. 1, 1982 by a rule change to 37 CFR 1.445 that was published in the *Official Gazette* at 1021 O.G. 11 on Aug. 10, 1982.

The Search fee for the European Patent Office was changed as of Jan. 3, 1985 and was announced in the *PCT Gazette* at No. 26/1984 page 3241 on Nov. 8, 1984 and in the *Official Gazette* at 1050 O.G. 330 on Jan. 15, 1985.

International PCT fees were changed by the PCT Assembly effective Jan. 1, 1985 and were announced in the *PCT Gazette* at No. 25/1984 page 3095 on Oct. 25, 1984 and in the *Official Gazette* at 1050 O.G. 330 on Jan. 15, 1985.

Note that the amount of the international search fee for the European Patent Office will change effective May 7, 1985 and the amounts of the International PCT fees will change effective May 28, 1985. For information on these fee changes see the notice appearing in the *Official Gazette* at 1053 O.G. 42 on Apr. 16, 1985.

The current schedule of PCT fees is as follows:

| | |
|---|---|
| Transmittal fee | $ 125.00 |
| Search fee | |
| U.S. Patent and Trademark Office as Searching Authority | |
| · No corresponding prior U.S. national application filed | 500.00 |
| · Corresponding prior U.S. national application filed | 250.00 |
| European Patent Office as Searching Authority | |
| · All cases | 690.00 |
| International fees | |
| Basic fee (first 30 pages) | 265.00 |
| Basic Supplemental fee (for each page over 30) | 5.00 |
| Designation fee (for the first 10 national or regional offices) | 64.00 |
| Designation fee for 11th and subsequent designations | No charge |

DONALD J. QUIGG,
Mar. 20, 1985. *Acting Commissioner of Patents and Trademarks.*

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### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), effective Nov. 1, 1984. If the maintenance fee is not paid in a patent requiring such payment, the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 11, 1982 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

| | |
|---|---|
| Plant Patents | None |
| Utility Patents | 4,328,592 through 4,329,740 |

Reissue Patents based on the above identified patents.

No maintenance fees are required for design patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 200.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

| | |
|---|---|
| By a small entity (§1.9(f)) | $ 200.00 |
| By other than a small entity | $ 400.00" |

The amounts of the surcharges, effective Nov. 1, 1984, are set forth in 37 CFR 1.20(k)-(m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . $ 100.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

| | |
|---|---|
| By a small entity (§1.9(f)) | $ 50.00 |
| By other than a small entity | $ 100.00" |

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee on a patent based on an application filed on or after Aug. 27, 1982, where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . $ 500.00"

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### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**3,979,296**, Re. S.N. 654,312, Filed Sept. 25, 1984, Cl. 210/324, FILTER, Wendel Bastgen, Owner of Record:

*Firma Albert Klein K.G., Nieder-Fishbach, Germany,* Attorney or Agent: Alan K. Roberts, et al., Ex. Gp.: 136

**4,056,953,** Re. S.N. 636,071, Filed July 30, 1984, Cl. 464/34, TORQUE LIMITING COUPLING, James Furlette, et al., Owner of Record: *Excel Corp., Fenton, Mich.,* Attorney or Agent: Ernest I. Gifford, Ex. Gp.: 342

**4,152,831,** Re. S.N. 608,549, Filed May 10, 1984, Cl. 030/296, A TOOL HOLDER, Peter O. Davies, Owner of Record: *Tullen Industries Ltd., Auckland, New Zealand,* Attorney or Agent: Marvin R. Stern, Ex. Gp.: 324

**4,241,756,** Re. S.N. 661,233, Filed Oct. 15, 1984, Cl. 137/496, EXHALATION VALVE ASSEMBLY, Clifford D. Bennett, Owner of Record: *Inspiron Corp., Rancho Cucamonga, Calif.,* Attorney or Agent: Robert Spensley, et al., Ex. Gp.: 347

**4,359,960,** Re. S.N. 673,442, Filed Nov. 20, 1984, Cl. 114/294, MARINE TETHER ANCHORING DEVICE, Clive J. Burchett, et al., Owner of Record: *Vickers Ltd., Vickers House, London SW1P 4RA, England,* Attorney or Agent: Elliott I. Pollock, et al., Ex. Gp.: 315

**4,364,751,** Re. S.N. 683,406, Filed Dec. 19, 1984, Cl. 055/96, SELF-CLEANING PULSED AIR CLEANER, George A. Copley, Owner of Record: *Donaldson Co., Inc., Minneapolis, Minn.,* Attorney or Agent: Paul A. Welter, et al., Ex. Gp.: 135

**4,368,731,** Re. S.N. 692,347, Filed Jan. 17, 1985, Cl. 604/272, PISTOL-TYPE SYRINGE, Heinrich W. Schramm, Owner of Record: *Henke-Sass, Wolf GmbH, Tuttlingen, Germany,* Attorney or Agent: Arthur Schwartz, et al., Ex. Gp.: 336

**4,462,769,** Re. S.N. 694,125, Filed Jan. 22, 1985, Cl. 418/001, METHOD AT AN OIL-INJECTED SCREW-COMPRESSOR, (Lars) Lauritz B. Schibbye, et al., Owner of Record: *Sullair Technology Ab, Stockholm, Sweden,* Attorney or Agent: Ernest A. Wegner, et al., Ex. Gp.: 343

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### REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**No Publications This Issue.**

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### U.S. GOVERNMENT-OWNED INVENTIONS
*Notice of Availability for Licensing*

The inventions listed below are owned by agencies of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 207 to achieve expeditious commercialization of results of federally funded research and development. Foreign patents are filed on selected inventions to extend market coverage for U.S. companies and may also be available for licensing.

Technical and licensing information on specific inventions may be obtained by writing to:

Office of Federal Patent Licensing
U.S. Department of Commerce
P.O. Box 1423
Springfield, Va. 22151

Please cite the number and title of inventions of interest.

DOUGLAS J. CAMPION,
Office of Federal Patent Licensing
National Technical Information Service
U.S. Department of Commerce.

#### DEPARTMENT OF AGRICULTURE

SN 6-696,222. IMPROVED METHOD AND APPARATUS FOR THE MASS REARING OF FRUIT FLIES.

SN 6-696,274. ELECTRONIC TEMPERATURE EQUALIZER.

SN 6-704,442. NOVEL DIOLEFIN PHEROMONE MIMICS AS DISRUPTANTS OF SEXUAL COMMUNICATION IN INSECTS.

#### DEPARTMENT OF COMMERCE

SN 6-680,114. METHOD AND APPARATUS FOR FOUR-BEAM RADAR.

SN 6-716,913. POLYUNSATURATED FATTY ACIDS FROM FISH OILS.

#### DEPARTMENT OF HEALTH AND HUMAN SERVICES

SN 6-696,538. MONOCLONAL ANTIBODIES AGAINST CHLAMYDIAL GENUS SPECIFIC LIPOPOLYSACCHARIDE.

SN 6-709,678. PURIFIED ANTIGEN FROM NON-A, NON-B HEPATITIS CAUSING FACTOR.

#### DEPARTMENT OF THE ARMY

SN 6-700,573. CYLINDRICAL CRYSTAL RESONATOR.

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### Patents Available for Licensing or Sale

Des. 229,895. COMBINED CAN OPENER AND SEALABLE POUR SPOUT. *Santo Musumeci,* P.O. Box 1443, Hawthorne, Calif. 90250.

3,862,876. PROTECTIVE EDGE WEIGHTED COVER CLOTH. *L. Graves,* 5927 S. Grant, Littleton, Colo. 80121.

4,504,054. ELBOW BRACE FOR BOWLERS AND GOLFERS. *Emanuel Jackson, et al.* — Correspondence should be addressed to: Edward M. Woodberry, 7401 N. Hampshire Ave., #903, Hyattsville, Md. 20783.

4,506,837. PROGRAMMING ON DEMAND CABLE SYSTEM AND METHOD. *Howard F. Walter,* P.O. Box 11617, Fort Wayne, Ind. 46859.

4,090,540. TREE OR STUMP SAW, 4,394,031. HITCH PIN RETAINER, 4,388,939. PORTABLE KNOCK-DOWN HUNTING BLIND, 4,299,522. TRACTOR MOUNTABLE FRONT AND REAR BALE-IMPALING HAY CARRIERS. *Cyril Barton,* Waltonville, Ill. 62894.

4,323,118. APPARATUS FOR CONTROLLING AND PREVENTING OIL BLOWOUTS. *Conrad Bergmann,* 1365 Lincoln Ave., San Jose, Calif. 95125.

4,239,030. FIELD BURNER APPARATUS. *Everett H. Benson.* Correspondence to: Mrs. Ruth Benson, 20568 S.E. Norse Rd., Eagle Creek, Oreg. 97022.

4,464,141. SHAFT COUPLING. and 4,477,912. CORRELATION DATA COMMUNICATIONS SYSTEM, *James A. Oliff, Esq.,* Parkhurst & Oliff, 277 S. Washington St., Suite 212, Alexandria, Va. 22314.

4,511,411. METHOD OF FORMING A HARD SURFACE LAYER ON A METAL COMPONENT. *Vereinigte Drahtwerke AG, Owner.* Correspondence should be addressed to: J. C. Holman, Holman & Stern, Chartered, 2401 Fifteenth St., N.W., Washington, D.C. 20009.

3,657,476. CRYPTOGRAPHY. 3,815,144. THERMAL RECORDER HAVING AN ANALOGUE TO DIGITAL CONVERTER., 3,964,061. SUCCESSIVE APPROXIMATION ANALOG TO DIGITAL CONVERTER. *Howard A. Aiken.* Correspondence should be addressed to: G. Franklin Rothwell; Bernard, Rothwell & Brown, P.C., 1700 K St., N.W., Washington, D.C. 20006.

The following patents are offered by Perry E. Burton and John V. Noonan (correspondence to James R. Paulk, Jr. or Charles T. Lester, Jr., Sutherland, Asbill & Brennan, 3100 First Atlanta Tower, Atlanta, Ga. 30383):

3,640,235. METHOD & APPARATUS FOR CUTTING & HEMMING CLOTH LENGTHS.
3,772,948. METHOD AND APPARATUS FOR FORMING CLOTH LENGTHS WITH FOLDED HEMS.
3,773,002. METHOD AND APPARATUS FOR FOLDING AND SEWING HEMS.
3,906,878. HEMMING METHOD AND APPARATUS.
4,157,692. LABEL DISPENSING SYSTEM FOR USE WITH SEWING APPARATUS.
4,132,184. SHEET MATERIAL GUIDANCE SYSTEM.
4,186,672. SEWING MACHINE MONITOR.
4,154,180. CUTTING & HEMMING SYSTEM.
4,271,774. CUTTING & HEMMING SYSTEM (DIVISIONAL).
4,224,886. CUTTING & HEMMING SYSTEM (DIVISIONAL).
4,269,130. SHEET PRODUCTION SYSTEM.
4,271,767. SHEET PRODUCTION SYSTEM (DIVISIONAL).
4,204,012. SHEET INSPECTION AND MARKING SYSTEM.
4,369,723. NEEDLE LUBRICATOR SYSTEM (2ND CONTINUATION).
4,227,684. SHEET FOLDER.
4,353,316. SHEET PRODUCTION SYSTEM WITH HEM EXPANDER.
4,462,322. SHEET PRODUCTION SYSTEM WITH HEM EXPANDER (DIVISIONAL).

General Electric Co. is prepared to grant non-exclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

Applications for license may be addressed to: General Electric Co., Component Products Group, 1635 Broadway, P.O. Box 2204, Fort Wayne, Ind. 46801-2204, Attention: Patent Counsel.

3,812,570. APPARATUS FOR HANDLING MAGNETIC CORES AND PERFORMING WINDING TREATMENT PROCEDURES.
3,903,593. METHOD FOR HANDLING MAGNETIC CORES AND PERFORMING WINDING TREATMENT PROCEDURES.
4,217,938. APPARATUS AND METHOD FOR MAKING DYNAMOELECTRIC MACHINE WINDINGS.
4,476,408. HIGH EFFICIENCY, LOW COST PERMANENT MAGNET AC MACHINE.
4,486,679. PERMANENT MAGNET ROTOR AND METHOD OF MAKING SAME.
4,499,660. METHOD OF MAKING A LAMINATED ROTOR FOR A DYNAMOELECTRIC MACHINE.

Applications for licenses may be addressed to the General Electric Co., Construction Equipment Business Operation, P.O. Box 704, Farmington, Conn. 06034-0704, Attention: Richard A. Menelly, Patent Counsel.

4,507,527. CURRENT LIMITING CIRCUIT-BREAKER HAVING AN IMPROVED CONTACT ARRANGEMENT.

Applications for license may be addressed to Patent Counsel, Gas Turbine Division, General Electric Co., 1 River Rd., Bldg. 500, Rm. 218, Schenectady, N.Y. 12345.

4,462,205. INTEGRATED COAL-FIRED GAS TURBINE POWER PLANT.
4,503,681. STATE-OF-THE-ART GAS TURBINE AND STEAM TURBINE POWER PLANT.

Applications for licenses may be addressed to: Patent Counsel, Capacitor Products Business Dept., General Electric Co., 1 John St., Bldg. 12, Hudson Falls, N.Y. 12839.

4,388,669. POLYGLYCOL DIELECTRIC CAPACITOR FLUID.
4,422,962. POLYGLYCOL DIELECTRIC CAPACITOR FLUID.
4,423,463. COMBINED CAPACITOR & RESISTOR.
4,439,812. IMPREGNATED CAPACITOR FOIL.
4,480,285. CAPACITOR.
4,482,478. BLENDS OF BRANCHED CHAIN PHTHALATE ESTERS AND HALOGENATED BENZENE COMPOUNDS.
4,482,931. METALLIZED CAPACITOR WITH IMPROVED BILAYER ELECTRODES.

# PATENT NOTICES

**Certificates of Correction for the Week of May 14, 1985**

| | | | |
|---|---|---|---|
| Re. 31,736 | 4,459,784 | 4,479,531 | 4,488,932 |
| Re. 31,760 | 4,463,077 | 4,479,980 | 4,488,958 |
| Re. 31,787 | 4,463,201 | 4,480,176 | 4,489,261 |
| 3,877,839 | 4,463,236 | 4,480,517 | 4,489,339 |
| 4,039,680 | 4,464,043 | 4,480,382 | 4,490,109 |
| 4,185,037 | 4,464,123 | 4,480,805 | 4,490,262 |
| 4,275,214 | 4,464,199 | 4,481,084 | 4,490,269 |
| 4,350,732 | 4,465,405 | 4,481,155 | 4,490,326 |
| 4,366,060 | 4,466,147 | 4,481,173 | 4,490,513 |
| 4,368,531 | 4,468,475 | 4,481,186 | 4,490,591 |
| 4,371,895 | 4,468,816 | 4,481,568 | 4,490,652 |
| 4,404,277 | 4,469,083 | 4,481,853 | 4,490,683 |
| 4,415,694 | 4,469,311 | 4,482,282 | 4,490,926 |
| 4,426,467 | 4,469,314 | 4,482,298 | 4,490,940 |
| 4,426,858 | 4,470,066 | 4,482,353 | 4,490,999 |
| 4,428,980 | 4,470,167 | 4,482,537 | 4,491,031 |
| 4,430,379 | 4,470,323 | 4,482,555 | 4,491,485 |
| 4,430,970 | 4,471,058 | 4,482,574 | 4,491,499 |
| 4,431,273 | 4,471,114 | 4,482,900 | 4,491,975 |
| 4,434,334 | 4,471,969 | 4,482,919 | 4,492,062 |
| 4,437,316 | 4,473,107 | 4,482,984 | 4,492,144 |
| 4,438,987 | 4,473,446 | 4,483,152 | 4,492,313 |
| 4,439,789 | 4,473,658 | 4,483,760 | 4,493,557 |
| 4,440,562 | 4,474,093 | 4,484,114 | 4,493,592 |
| 4,442,444 | 4,474,104 | 4,484,149 | 4,493,598 |
| 4,443,379 | 4,474,618 | 4,484,287 | 4,493,817 |
| 4,443,933 | 4,474,690 | 4,484,737 | 4,494,008 |
| 4,444,356 | 4,474,695 | 4,485,177 | 4,494,124 |
| 4,444,694 | 4,474,714 | 4,485,628 | 4,494,128 |
| 4,450,515 | 4,474,803 | 4,486,276 | 4,494,371 |
| 4,450,527 | 4,474,819 | 4,486,363 | 4,494,387 |
| 4,450,877 | 4,475,027 | 4,486,397 | 4,494,724 |
| 4,451,130 | 4,475,193 | 4,486,506 | 4,495,425 |
| 4,452,594 | 4,475,292 | 4,487,002 | 4,495,639 |
| 4,452,903 | 4,475,858 | 4,487,247 | 4,496,014 |
| 4,454,978 | 4,476,076 | 4,487,571 | 4,496,324 |
| 4,455,393 | 4,476,314 | 4,487,894 | 4,496,703 |
| 4,456,550 | 4,476,471 | 4,487,982 | |
| 4,457,998 | 4,477,365 | 4,488,188 | |
| 4,458,844 | 4,478,760 | 4,488,822 | |

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

| *State* | *Name of Library* | *Telephone Contact* |
|---|---|---|
| Alabama | Auburn University Libraries | (205) 826-4500 Ext.21 |
| | Birmingham Public Library | (205) 226-3680 |
| Alaska | Anchorage Municipal Libraries | (907) 264-4481 |
| Arizona | Tempe: Science Library, Arizona State University | (602) 965-7607 |
| Arkansas | Little Rock: Arkansas State Library | (501) 371-2090 |
| California | Los Angeles Public Library | (213) 612-3273 |
| | Sacramento: California State Library | (916) 322-4572 |
| | San Diego Public Library | (619) 236-5813 |
| | Sunnyvale: Patent Information Clearinghouse* | (408) 738-5580 |
| Colorado | Denver Public Library | (303) 571-2122 |
| Delaware | Newark: University of Delaware Library | (302) 738-2238 |
| Florida | Fort Lauderdale: Broward County Main Library | (305) 357-7444 |
| | Miami–Dade Public Library | (305) 579-5001 |
| Georgia | Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology | (404) 894-4508 |
| Idaho | Moscow: University of Idaho Library | (208) 885-6235 |
| Illinois | Chicago Public Library | (312) 269-2865 |
| | Springfield: Illinois State Library | (217) 782-5430 |
| Indiana | Indianapolis–Marion County Public Library | (317) 269-1706 |
| Louisiana | Baton Rouge: Troy H. Middleton Library, Louisiana State University | (504) 388-2570 |
| Maryland | College Park: Engineering and Physical Sciences Library, University of Maryland | (301) 454-3037 |
| Massachusetts | Amherst: Physical Sciences Library, University of Massachusetts | (413) 545-1370 |
| | Boston Public Library | (617) 536-5400 Ext. 265 |
| Michigan | Ann Arbor: Engineering Transportation Library, University of Michigan | (313) 764-7494 |
| | Detroit Public Library | (313) 833-1450 |
| Minnesota | Minneapolis Public Library & Information Center | (612) 372-6570 |
| Missouri | Kansas City: Linda Hall Library | (816) 363-4600 |
| | St. Louis Public Library | (314) 241-2288 Ext. 390 |
| Montana | Butte: Montana College of Mineral Science and Technology Library | (406) 496-4283 |
| Nebraska | Lincoln: University of Nebraska-Lincoln, Engineering Library | (402) 472-3411 |
| Nevada | Reno: University of Nevada Library | (702) 784-6579 |
| New Hampshire | Durham: University of New Hampshire Library | (603) 862-1777 |
| New Jersey | Newark Public Library | (201) 733-7815 |
| New Mexico | Albuquerque: University of New Mexico Library | (505) 277-5441 |
| New York | Albany: New York State Library | (518) 474-5125 |
| | Buffalo and Erie County Public Library | (716) 856-7525 Ext. 267 |
| | New York Public Library (The Research Libraries) | (212) 714-8529 |
| North Carolina | Raleigh: D. H. Hill Library, N.C. State University | (919) 737-3280 |
| Ohio | Cincinnati & Hamilton County, Public Library of | (513) 369-6936 |
| | Cleveland Public Library | (216) 623-2870 |
| | Columbus: Ohio State University Libraries | (614) 422-6286 |
| | Toledo/Lucas County Public Library | (419) 255-7055 Ext. 212 |
| Oklahoma | Stillwater: Oklahoma State University Library | (405) 624-6546 |
| Oregon | Salem: Oregon State Library | (503) 378-4243 |
| Pennsylvania | Cambridge Springs: Alliance College Library | (814) 398-2098 |
| | Philadelphia: Franklin Institute Library | (215) 448-1227 |
| | Pittsburgh: Carnegie Library of Pittsburgh | (412) 622-3138 |
| | University Park: Pattee Library, Pennsylvania State University | (814) 865-4861 |
| Rhode Island | Providence Public Library | (401) 521-8726 |
| South Carolina | Charleston: Medical University of South Carolina Library | (803) 792-2372 |
| Tennessee | Memphis & Shelby County Public Library and Information Center | (901) 725-8876 |
| Texas | Austin: McKinney Engineering Library, University of Texas | (512) 471-1610 |
| | College Station: Sterling C. Evans Library, Texas A & M University | (409) 845-2551 |
| | Dallas Public Library | (214) 749-4176 |
| | Houston: The Fondren Library, Rice University | (713) 527-8101 Ext. 2587 |
| Utah | Salt Lake City: Marriott Library, University of Utah | (801) 581-8394 |
| Washington | Seattle: Engineering Library, University of Washington | (206) 543-0740 |
| Wisconsin | Madison: Kurt F. Wendt Engineering Library, University of Wisconsin | (608) 262-6845 |
| | Milwaukee Public Library | (414) 278-3247 |

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# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**JAMES E. DENNY, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF April 13, 1985**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director | 3-28-83 |
| ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director | 6-01-83 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director | 12-12-83 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 5-24-83 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director | 9-28-82 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director | 1-03-83 |
| INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director | 5-17-82 |
| RECEPTACLES, CLEANING, WINDING, AND MEASURING, GROUP 240—G. M. FORLENZA, Director | 7-20-81 |
| ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director | 10-1-80 |
| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director | 9-20-82 |
| DESIGN, GROUP 290—K. L. CAGE, Director | 1-03-83 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director | 1-05-83 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director | 5-26-83 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director | 3-08-83 |
| SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director | 10-25-82 |
| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director | 3-21-83 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during April 1985, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

**Patents** ..... Numbers 3,375,529 to 3,381,302, inclusive

**Plant Patents** ..... Numbers 2,802 to 2,810 inclusive

# REEXAMINATIONS

## MAY 14, 1985

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 Plant 3,971 (345th)**
**NEOREGELIA PLANT**
**Paul de Coster, Ruitersdreef 1, Melle, B-9230, and Adrien Simoens, Zonneveld 21, Merelbeke, B-9920, both of Belgium**
**Reexamination Request No. 90/000,557, May 16, 1984.**
**Reexamination Certificate for Patent No. Plant 3,971, issued Nov. 2, 1976, Ser. No. 596,441, Jul. 16, 1975.**
**Claims priority, application Belgium, Jan. 13, 1975, PVO/152.338**
**Int. Cl.³ A01H** *5/00*
**U.S. Cl. Plt.—88**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **1** is confirmed.

**1**. A new cultivar, of Neoregelia characterized by its broader leaves; a more compact plant rosette comprised of some thirty leaves with a width of about 5 cm. which have in the middle along the lengthwise axis, a cream white stripe 2.5 to 3 cm. wide, sometimes with very fine green lines therethrough; inflorescence in the form of red coloring of about six bracts, while certain of said cream-white stripes of the lowermost leaves display a pink-red coloring.

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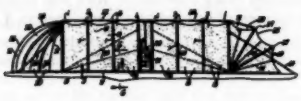
**B1 4,034,772 (346th)**
**VAULTED MEMBRANE SHELTER**
**Carl F. Huddle, Pleasant Ridge, Mich., assignor to Tension Structures Co., Pleasant Ridge, Mich.**
**Reexamination Request No. 90/000,125, Dec. 14, 1981.**
**Reexamination Certificate for Patent No. 4,034,772, issued Jul. 12, 1977, Ser. No. 597,970, Jul. 21, 1975.**
**Continuation-in-part of Ser. No. 339,333, Mar. 8, 1973, which is a continuation-in-part of Ser. No. 93,293, Nov. 27, 1970, abandoned. The portion of the term of this patent subsequent to Jun. 9, 1993, has been disclaimed.**
**The portion of the term of this patent subsequent to Jun. 9, 1993, has been disclaimed.**
**Int. Cl.³ A45F** *1/12, 1/16*
**U.S. Cl. 135—119**



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–31** is confirmed.

**1**. A vaulted membrane shelter comprising at least two substantially vertical arches with curved bights mounted on a base, face to face, but spaced apart with their respective ends aligned to form a framework; a flexible roof membrane extending between, and being operatively attached to, said arches and said base that is tensioned longitudinally and transversely with an inward concave curvature between at least the bights of said arches, said inward curvature having been formed by said membrane having a longer circumferential length at where it is operatively attached to said arches then its circumferential length in a vertical plane midway between said arches; and means acting between at least one of said vertical arches and said base for fixing said arches apart to maintain tension in said membrane.

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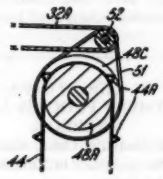
**B1 4,120,391 (347th)**
**CONVEYOR SYSTEMS FOR CIGARETTES AND OTHER ROD-LIKE ARTICLES**
**Desmond W. Molins; Dennis Hinchcliffe, and Peter A. Clarke, all of London, England, assignors to Molins Limited, England**
**Reexamination Request No. 90/000,302, Dec. 6, 1982.**
**Reexamination Certificate for Patent No. 4,120,391, issued Oct. 17, 1978, Ser. No. 408,256, Oct. 23, 1973.**
**Claims priority, application United Kingdom, Oct. 27, 1972, 49787/72**
**Int. Cl.³ B65G** *43/08*
**U.S. Cl. 198—347**




AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–55** is confirmed.

New claims **56–65** are added and determined to be patentable.

**1**. A conveyor system for conveying a stack of cigarettes or the like, comprising means defining a channel for the passage of a continuous stack of cigarettes, said channel having a wall formed partly by a conveyor having protrusions at regular intervals on its operative face which contacts the stack of cigarettes during use, and a pulley having a middle part around which the conveyor passes and two coaxial outer parts on opposite sides of the middle part and of a larger diameter than the middle part for guiding the cigarettes in the region of the pulley.

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**B1 4,232,619 (348th)**
**LIFTING LOOP**
**Bengt E. Lindahl, Gothenburg, Sweden, assignor to Svensk Lasthantering, Bengt Lindahl AB, Torslanda, Sweden**
**Reexamination Request No. 90/000,016, Jul. 2, 1981.**
**Reexamination Certificate for Patent No. 4,232,619, issued Nov. 11, 1980, Ser. No. 899,734, Apr. 25, 1978.**
**Filed Jul. 2, 1981, Ser. No. 899,734**
**Int. Cl.³ D05B** *93/00*
**U.S. Cl. 112—417**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–6** are cancelled.

**[1**. An improved flexible lifting loop of sufficient length to

encircle and support a large lifting load comprising a core of parallel threads, a protecting covering enclosing said core and retained about said core by a seam extending in the longitudinal direction of the loop, the improvement comprising said seam being a side seam, said threads and said covering having

sufficient flexibility to conform to the shape of a lifting hook or the like and the engaged portion of the lifted load, said seam when stitching together said protecting covering making said covering enclose said core snugly and retain said threads in their parallel relationship when said loop is engaged with a load.]

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**B1 4,276,329 (349th)**

**WOOD TREATMENT PROCESS AND PRODUCT THEREOF**

**Ramesh C. Vasishth, Danville, Calif., and Dodwell P. deSilva, Vancouver, Canada, assignors to Envirosol Systems International, Ltd., Orinda, Calif.**

**Reexamination Request No. 90/000,338, Mar. 7, 1983.**
**Reexamination Certificate for Patent No. 4,276,329, issued Jun. 30, 1981, Ser. No. 91,030, Nov. 5, 1979.**
**Continuation-in-part of Ser. No. 23,051, Mar. 22, 1979, abandoned.**
**Claims priority, application Canada, May 16, 1979, 327689**
**Int. Cl.[3] B05D** *1/18, 3/02*
**U.S. Cl. 427—393**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–23** are now disclaimed.

**1**. A method for treating wood to enhance its properties comprising: contacting the wood to be treated with sufficient water dilutable resin in a water miscible solvent to deposit an effective amount of said resin in the cell walls of said wood, said resin containing molecules having a molecular weight of less than about 1000 and of a size which can enter the free space in said cell walls in the presence of said solvent in an amount sufficient to stabilize the wood, and converting the resin in said cell walls to a water insoluble form at ambient conditions.

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**B1 4,367,157 (350th)**

**SOFT CONTACT LENS AMBIENT TEMPERATURE DISINFECTANT SOLUTION CONTAINING ASCORBIC ACID OR SALT THEREOF**

**Guy J. Sherman, Mandeville, La., assignor to Sherman Laboratories, Inc., Abita Springs, La.**

**Reexamination Request No. 90/000,550, May 2, 1984.**
**Reexamination Certificate for Patent No. 4,367,157, issued Jan. 4, 1983, Ser. No. 228,562, Jan. 26, 1981.**
**Continuation-in-part of Ser. No. 37,645, May 10, 1979.**
**The portion of the term of this patent subsequent to Oct. 26, 1999, has been disclaimed.**
**Int. Cl.[3] C11D** *3/48, 1/04*
**U.S. Cl. 252—106**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **6–8** is confirmed.

Claims **1–5, 9** and **10** are cancelled.

[**1**. An aqueous composition which disinfects soft and semi-hard contact lenses at ambient temperature consisting essentially of:

water, a first compound selected from the group consisting of ascorbic acid, sodium ascorbate, calcium ascorbate and mixtures thereof, said first component present in an amount of between about 0.1% and 20% by weight of said total aqueous composition calculated as ascorbic acid, and a second compound selected from the group consisting of trimethoprim and thimerosal, said second compound present in an amount of between about 0.0001% and 5.0% by weight of said total aqueous composition, said aqueous composition being compatible with soft contact lenses to allow storage of soft contact lenses therein.]

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

**Re. 31,881**

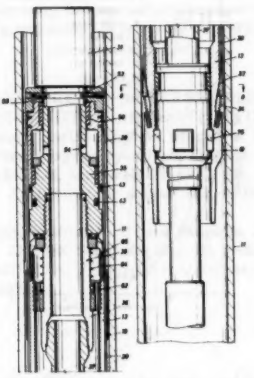
## SETTING TOOLS AND LINER HANGER ASSEMBLY

**Hiram E. Lindsey, Jr., Midland, Tex., assignor to MWL Tool and Supply Company, Midland, Tex.**

**Original No. 4,287,949, dated Sep. 8, 1981, Ser. No. 109,979, Jan. 7, 1980. Application for reissue Sep. 6, 1983, Ser. No. 529,757**

**Int. Cl.³ E21B *23/04***

**U.S. Cl. 166—212** **15 Claims**



1. A liner hanger and setting tool for use in a well bore comprising:

a liner hanger body member having slip means disposed about its outer circumference, said slip means being movable between a retracted condition and an extended condition in which the slip means engage a well bore, said body member having its lower end adapted for connection to a tubular string of pipe;

a setting tool including tubular means extending through said body member

said tubular means at its upper end having a hydraulically operated pressure means, said pressure means in one operative position being releasably coupled to said slip means to normally retain said slip means in a retracted condition and in another operative position being released from said slip means, permitting said slip means to be in an extended condition,

*spring means normally biasing said slip means toward said extended condition and for independently moving said slip means between said retracted condition and said extended condition;*

said tubular means intermediate of its length having a releasable rotative connection with said body member which is operative to release said tubular means from said body member upon relative rotation therebetween,

said tubular means at its lower end having pack-off means, *means for* releasably [interconnected] *interconnecting said pack-off means* with said body member and operative to be released from interconnection with said body member upon relative longitudinal movement between said tubular means and said body member.

7. A setting tool for use with a liner hanger in a well bore comprising

a tubular mandrel adopted for coupling between a string of tubular members,

a pressure operated sleeve slidably disposed on the upper end of said tubular mandrel, shear means for releasably retaining said sleeve in one position on said tubular mandrel, port means in said tubular mandrel for providing fluid pressure access to said sleeve, spring biased locking means in said sleeve adapted for cooperation with an annular locking groove in said tubular mandrel in another position of said sleeve on said tubular mandrel,

a nut member slidably mounted on said tubular mandrel, said nut member having an external threaded portion for interconnection with a threaded portion of a liner hanger, a nut housing rotatably mounted on said tubular mandrel above said nut member and having a hollow interior adopted to receive said nut member and having a lower end adopted to engage a liner hanger, spring means disposed in said nut housing for applying a compression force on said nut member, and

a tubular seal member slidably mounted on the lower end of said tubular mandrel, said seal member having pack-off means and spring biased latch members, said latch members normally extending outwardly of the seal member, said tubular mandrel havng a recessed portion permitting said latch members to retract relative to said seal member when said recessed portion is disposed adjacent to said latch members.

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**Re. 31,882**

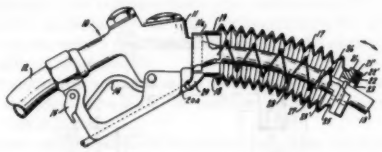
## LIQUID DISPENSING NOZZLE ASSEMBLY AND METHOD OF USING SAME

**Peter P. Moskovich, Gary, Ind., assignor to Atlantic Richfield Company, Harvey, Ill.**

**Original No. 4,008,738, dated Feb. 22, 1977, Ser. No. 536,533, Dec. 26, 1974. Application for reissue Apr. 7, 1980, Ser. No. 134,142**

**Int. Cl.³ B65B *31/06***

**U.S. Cl. 141—5** **42 Claims**



1. A liquid-dispensing nozzle assembly for delivery of liquid from a liquid source to a liquid receiver having a receiver inlet, said assembly being provided with means to reduce escape of vapor during delivery of liquid to said receiver inlet from said source, said nozzle assembly comprising:

a liquid dispensing nozzle having a nozzle inlet, a nozzle housing and an elongated discharge spout adapted for insertion into said receiver inlet;

a flexible vapor collector surrounding, in spaced relation thereto and forming a chamber therearound, the upper portion of said spout nearest said nozzle housing, said chamber being in fluid communication with said receiver inlet during said liquid delivery, one end of said vapor collector being attached to said nozzle housing;

a face means located adjacent to and carried by the second end of said vapor collector away from said end attached to said housing for forming a surface seal against the outer surface of said receiver inlet, provided that said spout extends beyond said second end of said vapor collector during said liquid dispensing; and

at least two spring members located in spaced relation thereabout said spout and acting to extend said vapor collec-

tor means, each of said spring members having one end attached to a different point of said face means so that said face means has substantially free rotational movement transverse to the axis of said spout.

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**Re. 31,883**

## RESINOID GRINDING WHEELS CONTAINING NICKEL-COATED CUBIC BORON NITRIDE PARTICLES

**Harold P. Bovenkerk, Worthington, and William A. Berecki, Columbus, both of Ohio, assignors to General Electric Company, Worthington, Ohio**

**Original No. 3,645,706, dated Feb. 29, 1972, Ser. No. 885,630, Dec. 16, 1969. Application for reissue Dec. 9, 1977, Ser. No. 859,243**

**Int. Cl.³ B24D** *17/00*

**U.S. Cl. 51—295** **9 Claims**

1. In a grinding wheel for hardened steel and steel alloys, an abrasive surface consisting of nickel-coated cubic boron nitride particles, the nickel constituting from 30 to 80 weight percent of the coated particles, said coated particles being embedded in a matrix of resinous material selected from the group consisting of phenol-formaldehyde, urea-formaldehyde, melamine-formaldehyde, epoxy, polyester, polyamide and polyimide resins, and mixtures thereof, *said wheel being formed in a mold by pressing to a stop.*

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**Re. 31,884**

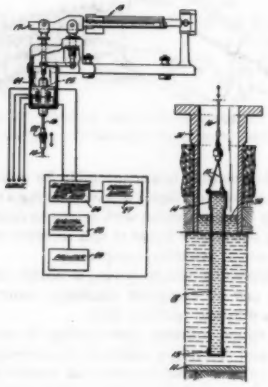
## METHOD FOR LEAKAGE MEASUREMENT

**William B. Hansel, Media, Pa., and Earl W. Smith, Wilmington, Del., assignors to Hunter Environmental Services, Inc., Malvern, Pa.**

**Original No. 4,300,388, dated Nov. 17, 1981, Ser. No. 84,241, Oct. 12, 1979. Application for reissue Aug. 5, 1982, Ser. No. 405,492**

**Int. Cl.³ G01M** *3/32;* **G01F** *23/20*

**U.S. Cl. 73—49.2** **14 Claims**



1. A method of high sensitivity for measuring leakage of liquid into or out of a storage tank *normally at atmospheric pressure* which comprises introducing a freely suspended sensor into the liquid in the tank *through the fill-pipe or other access hole of said tank*, said sensor being coupled to means for sensing mass displacement, [and] observing the change of displacement of said sensor over a period of time to determine a change of liquid mass in said tank, *and subsequently removing said sensor from said tank.*

**Re. 31,885**

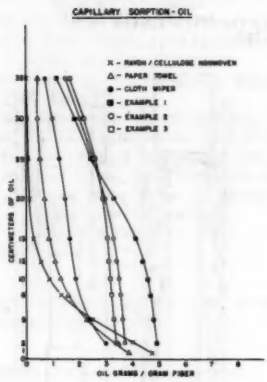
## MICROFIBER OIL AND WATER WIPE

**Gary H. Meitner, Winneconne, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.**

**Original No. 4,307,143, dated Dec. 22, 1981, Ser. No. 170,904, Jul. 21, 1980. Continuation-in-part of Ser. No. 1,744, Jan. 8, 1979, abandoned, and a continuation-in-part of Ser. No. 843,001, Oct. 17, 1977, abandoned. Application for reissue Dec. 20, 1983, Ser. No. 563,713**

**Int. Cl.³ A47L** *13/17;* **B32B** *3/00;* **D04H** *1/04*

**U.S. Cl. 252—91** **4 Claims**


CAPILLARY SORPTION - OIL
X - RAYON / CELLULOSE NONWOVEN
△ - PAPER TOWEL
● - CLOTH WIPER
■ - EXAMPLE 1
○ - EXAMPLE 2
□ - EXAMPLE 3
CENTIMETERS OF OIL
OIL GRAMS / GRAM FIBER

1. A wiper that is both oil and water absorbent and having a reduced tendency to leave streaks and spots consisting essentially of a melt blown polypropylene web having a basis weight in the range of from about 1.5 to 3.5 oz. per square yard and containing about 0.1 to 0.6% by weight of a wetting agent selected from the group consisting of dioctylester of sodium sulfosuccinic acid and isooctyl phenylpolyethoxy ethanol and formed from fibers having an average diameter in the range of up to 10 microns, said wiper having been embossed under conditions of at least 20 psi pressure at a temperature in the range of 180° F. to 245° F.

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**Re. 31,886**

## MOISTURE-VAPOR-PERMEABLE PRESSURE-SENSITIVE ADHESIVE MATERIALS

**Martin E. Hodgson, Harlow, England, assignor to T. J. Smith & Nephew Limited, Kingston-upon-Hull, England**

**Original No. 3,645,835, dated Feb. 29, 1972, Ser. No. 839,436, Jul. 7, 1969. Division of Ser. No. 157,288, Jun. 5, 1980,. Application for reissue May 12, 1983, Ser. No. 494,013**

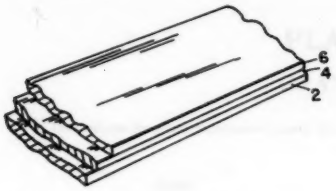
**Claims priority, application United Kingdom, Jul. 9, 1968, 32588/68; Oct. 22, 1968, 50045/68; Dec. 20, 1968, 60756/68**

**Int. Cl.³ B32B** *7/10, 27/40;* **A61F** *13/02;* **A61L** *15/06*

**U.S. Cl. 428—40** **14 Claims**

27. A moisture-vapor-permeable adhesive dressing for use on human skin which adhesive dressing when in use on human skin consists of a polyurethane backing material with a pressure-sensitive adhesive on the whole of the skin-adhering face thereof, said backing material being continuous and consisting of a film of thermoplastic polyurethane which is permeable to oxygen and moisture vapor but is unaffected by and impermeable to liquid water, said adhesive comprising an acrylic ester co-polymer containing hydrophillic groups which is permeable to oxygen and moisture vapor but is unaffected by and

impermeable to liquid water where in the hydrophillic group is a hydroxyl, carboxyl, amine, amide, ether or alkoxy group,




said adhesive dressing having a moisture-vapor-permeability of at least 300 g./sq. meter/24 hours/40° C./80% RH.

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**Re. 31,887**

## MOISTURE-VAPOR-PERMEABLE PRESSURE-SENSITIVE ADHESIVE MATERIALS

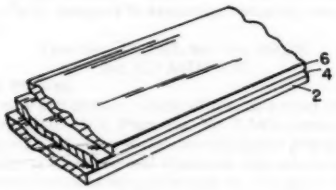
**Martin E. Hodgson, Harlow, England, assignor to T. J. Smith & Nephew Limited, Kingston-upon-Hull, England**

**Original No. 3,645,835, dated Feb. 29, 1972, Ser. No. 839,436, Jul. 7, 1969. Application for reissue Jun. 6, 1980, Ser. No. 157,288**

**Claims priority, application United Kingdom, Jul. 9, 1968, 32588/68; Oct. 22, 1968, 50045/68; Dec. 20, 1968, 60756/68**

**Int. Cl.**[3] **B32B** *7/10, 27/40;* **A61F** *13/02;* **A61L** *15/06*

**U.S. Cl. 428—355** **16 Claims**




1. A moisture-vapour-permeable pressure-sensitive adhesive material for use on [animal]*human* skin [and nails,] comprising a *continuous* backing material, *which is an unreinforced thermoplastic polyurethane film* and a *continuous* pressure-sensitive adhesive on at least substantially the whole of the body-adhering portion of at least one surface of said *continuous* backing material, both said *continuous* backing material and said *continuous* adhesive being [moisture-vapour-permeable and]*oxygen-permeable,* [and at least on of said backing material and said adhesive comprising a] synthetic polymer [and being continuous] *which are moisture vapour permeable,* unaffected by water and nonpermeable to liquid water, said adhesive material having a moisture vapor permeability of at least [300] *500* g./sq. meter/24 hours/40° C./80 percent RH.

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**Re. 31,888**

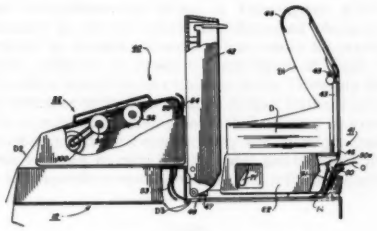
## SENSOR CONTROLLING IN COMPUTER FANFOLD REPRODUCTION

**Joseph W. Ward, Pittsford, and Russell G. Schroeder, II, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Original No. 4,320,960, dated Mar. 23, 1982, Ser. No. 75,868, Sep. 17, 1979. Application for reissue Jul. 11, 1983, Ser. No. 512,808**

**Int. Cl.**[3] **G03G** *15/00*

**U.S. Cl. 355—14 R** **18 Claims**



1. In a reproduction machine adapted to handle document material in the form of a computer fanfold web consisting of a plurality of frame sections and being formed with equally spaced openings along one or both edges for cooperation with a tractor drive for imparting movement of the web, the machine having a processor for reproducing copies of the frames positioned on an exposure platen, the combination of:

control system associated with the tractor drive for advancing the web to position the frames upon the platen manually or automatically,

sensing means arranged in the path of movement of the web and adapted to sense the openings along an edge of the web material,

circuit means connected to said sensing means and arranged to produce a frequency of pulses in accordance with the sensed rate of openings movement, and control means associated with said circuit means for effecting the shutdown of the machine in the event said frequency of pulses deviates from a reference frequency.

# PLANT PATENTS

## GRANTED MAY 14, 1985

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

**5,466**

### HYBRID TEA ROSE PLANT CV. AROSUMO

**Jack E. Christensen, Ontario, Calif., assignor to Armstrong Nurseries, Inc., Ontario, Calif.**

**Filed Sep. 13, 1983, Ser. No. 651,695**
**Int. Cl.[3] A01H** *5/00*

**U.S. Cl. Plt.—15** **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, being particularly characterized in that its abundant production of well formed yellow flowers essentially as described and illustrated; its very vigorous growth; its well-above-average disease resistance; its well-above-average level of hardiness; its abundant foliage which clothes the entire plant and its low-thorned stems that are of suitable length for cutting.

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**5,467**

### ROSE CV. AROFEIGEL

**John R. Feigel, Evansville, Ind., and Jack E. Christensen, Ontario, Calif., assignors to Armstrong Nurseries, Inc., Ontario, Calif.**

**Filed Sep. 12, 1983, Ser. No. 531,255**
**Int. Cl.[3] A01H** *5/00*

**U.S. Cl. Plt.—18** **1 Claim**

1. A new and distinct variety of rose as a sport of the rose "Century Two" (U.S. Plant Pat. No. 3,340) characterized in that it produces flowers of significantly lighter pink coloration, essentially as described and illustrated and otherwise having the characteristics of the parent rose cv. "Century Two."

**5,468**

### PEAR TREE

**Lyle A. Brooks, Forest Grove, Oreg., assignor to Carlton Nursery Company, Inc., Dayton, Oreg.**

**Filed Sep. 20, 1983, Ser. No. 534,180**
**Int. Cl.[3] A01H** *5/03*

**U.S. Cl. Plt.—36** **1 Claim**

1. A new and distinct variety of pear tree referred to by the cultivar designation Old Home × Farmingdale #217 and substantially as herein shown and described characterized particularly by its ability to serve as a rootstock for grafting of pear tree cultivars to produce "semi-standard" pear trees; further characterized by its resistance to the Fireblight disease and its tolerance of the Pear Decline disease; further characterized by its non-rootsuckering habit, its hardiness, its excellent root-anchorage, its good compatibility with all major commercial pear varieties, its early bearing habit, and its ability to root easily and reproduce readily by hard and softwood cuttings.

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**5,469**

### PRIVET PLANT

**Byron E. Wates, 9403 Mirror Pond Ct., Fairfax, Va. 22031 (executrix; E. Inez Wates)**

**Filed Sep. 25, 1981, Ser. No. 305,494**
**Int. Cl.[3] A01H** *5/00*

**U.S. Cl. Plt.—54** **1 Claim**

1. A new and distinctive variety of Ligustrum substantially as herein shown and described, particularly characterized by its small leaves, dense foliage and twiggy growth habit.

# PATENTS

## GRANTED MAY 14, 1985

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 604–022 | 4,516,398 |
| 073–164 | 4,516,414 |
| 081–020 | 4,516,615 |
| 173–053 | 4,516,662 |
| 426–655 | 4,517,120 |
| 514–249 | 4,517,179 |
| 514–016 | 4,517,180 |
| 514–012 | 4,517,181 |
| 514–413 | 4,517,182 |
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| 514–212 | 4,517,184 |
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| 514–255 | 4,517,186 |
| 514–250 | 4,517,187 |
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| 514–345 | 4,517,192 |
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| 514–184 | 4,517,194 |
| 514–413 | 4,517,195 |
| 514–371 | 4,517,196 |
| 514–376 | 4,517,197 |
| 514–400 | 4,517,198 |
| 514–392 | 4,517,199 |
| 514–455 | 4,517,200 |
| 514–521 | 4,517,201 |
| 514–530 | 4,517,202 |
| 428–632 | 4,517,217 |
| 425–457 | 4,517,248 |
| 423–501 | 4,517,322 |
| 235–095 | 4,517,450 |
| 235–379 | 4,517,451 |

# PATENTS

## GRANTED MAY 14, 1985

## GENERAL AND MECHANICAL

**4,516,273**

### UPPER BODY PROTECTOR APPARATUS AND METHOD

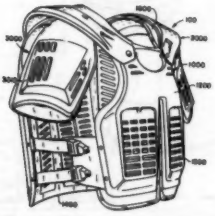
**John R. Gregory, 303 W. 35th St., Suite C, National City, Calif. 92050; Gerald Parks, Denver, Colo., and John D. Dondero, Sun Valley, Id., assignors to John R. Gregory, Chula Vista, Calif.**

**Continuation of Ser. No. 493,736, May 11, 1983, Pat. No. 4,467,475. This application Jul. 9, 1984, Ser. No. 629,183**

**The portion of the term of this patent subsequent to Aug. 28, 2001, has been disclaimed.**

**Int. Cl.³ A41D** *13/00*

**U.S. Cl. 2—2** **17 Claims**



1. An upper body protector comprising:

an upper body shield having a chest plate portion, a back plate portion, and left and right shoulder portions adapted to conformably embrace the chest, back and shoulders of a wearer;

a pair of stiff flexible shoulder flaps each being hingedly connected at fixed pivot points to front and back portions of the left and right shoulder portions, respectively, of said upper body shield so that each of said shoulder flaps is superposed over respective left and right shoulder portions, and so that each of said shoulder flaps is movable in an arcuate path about said pivot points between an uppermost and lowermost position; and

a pair of epaulets, each being hingedly connected to respective shoulder flaps.

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**4,516,274**

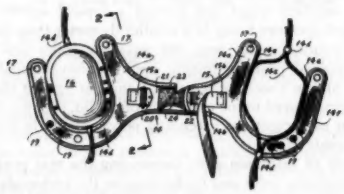
### ADJUSTABLE EARCUP RETENTION HARNESS

**Bruce E. Buckland, Franklin, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jan. 26, 1984, Ser. No. 573,902**

**Int. Cl.³ A42B** *1/06*

**U.S. Cl. 2—209** **5 Claims**



1. A flexible harness adapted to be secured to a rigid protective helmet adapted to receive the head of a wearer, said harness having two U-shaped end portions located so as to partially encircle the ears of the wearer, said U-shaped end positions connected by means of a nape strap, means attached to said U-shaped end portions to hold earcups in position so as to cover the ears of the wearer, said means permitting rotational and vertical adjustment of the position of the earcups to cover the ears of the wearer.

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**4,516,275**

### GARMENT SUSPENSION WAISTBAND

**Warren C. Schroeder, 2400 Virginia Ave., NW., C-603, Washington, D.C. 20037**

**Filed Nov. 12, 1981, Ser. No. 320,603**

**Int. Cl.³ A41F** *19/00*

**U.S. Cl. 2—308** **2 Claims**

1. An improved garment waistband secured to the upper portion of a wearing apparel body garment of the type having a waistband, said waistband having inner and outer surfaces, a plurality of belt loops secured to the inner surface of said waistband at their lower ends only and at a distance from the upper margin of the waistband by a least the length of the loops including separable fastening means between said loop and said waistband.

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**4,516,276**

### BONE SUBSTITUTE AND A METHOD OF PRODUCTION THEREOF

**Heinz Mittelmeier, Homburg-Schwarzenbach, Fed. Rep. of Germany; Heinz Moser, Selzach, and Beat Leu, Ipsach, both of Switzerland, assignors to Oscobal AG, Selzach, Switzerland**

**Continuation of Ser. No. 217,455, Dec. 17, 1980, abandoned. This application Mar. 26, 1984, Ser. No. 593,174**

**Claims priority, application European Pat. Off., Dec. 18, 1979, 79810183.8**

**Int. Cl.³ A61F** *1/00, 1/24*

**U.S. Cl. 3—1.91** **8 Claims**

1. A bone substitute consisting essentially of a mixture of collagen fleece with apatite in the form of powder or granules, wherein the collagen is present in the form of an enzymatically treated, cleansed, lyophilized and sterilized collagen fleece.

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**4,516,277**

### ARTICLE COMPRISING AND METHOD FOR FABRICATING A HIP PROSTHESIS HAVING A FLEXIBLE MULTI-ELEMENT FEMORAL ROD

**Jean Butel, 19 Avenue de Plain Fleurie, Meylan, Isere, France**

**Filed Dec. 3, 1982, Ser. No. 446,650**

**Claims priority, application France, Dec. 8, 1981, 81 23325**

**Int. Cl.³ A61F** *1/04;* **B21D** *39/00*

**U.S. Cl. 3—1.913** **19 Claims**

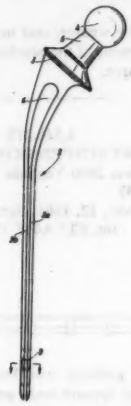
1. In a process for making a hip prosthesis including a bulbous head, a neck extending from said head, a plate connected to the neck opposite the head, and a femoral rod attached to, and extending from, the plate in a direction away from the neck, the improvment comprising:

forging said head, neck, plate and rod as a single unitary piece;

cutting said rod once along one longitudinally extending portion thereof to form a pair of opposing longitudinal elements; and

linking said pair of elements with separate holding means, said separate holding means both permitting relative movements of said elements longitudinally of one another

during flexing of said elements, and holding said pair of elements in opposing relationship while preventing the



ends of said longitudinal elements from moving apart from one another.

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**4,516,278**

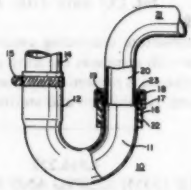
**FLEXIBLE PLUMBING TRAP**

**Lee T. Lamond, 613 Shearer St., North Wales, Pa. 19454**

**Continuation-in-part of Ser. No. 126,546, Mar. 3, 1980, abandoned. This application Oct. 27, 1980, Ser. No. 200,954**

**Int. Cl.³ E03C *1/00*; F16K *9/00***

**U.S. Cl. 4—191** **15 Claims**



**1.** A flexible plumbing trap for use with drain pipes from plumbing fixtures which drain pipes include one smooth straight drain pipe and one drain pipe with rim means on its end which trap comprises

an arcuate tubular hollow central body portion,

one end portion extending from said body portion and of different diameter than said body portion for engagement with said smooth straight drain pipe,

adjustable clamp means for detachably connecting said one end portion of said trap to said smooth straight drain pipe,

an other end portion of said trap extending from said body portion,

a collar member engaged with the said other end portion of said trap and said drain pipe rim means end,

a collar nut engaged with said rim means end of said drain pipe and said collar member, and

said collar nut is deformable for movement over said rim means and has a pair of opposed locking ears which engage said rim means.

**4,516,279**

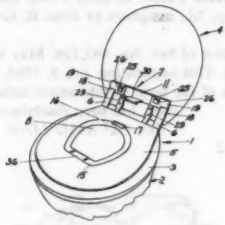
**UNIVERSAL CHILD'S TOILET TRAINER**

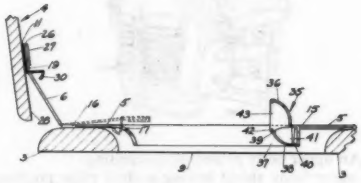
**Richard M. Block, 1340 Custer Ave., Cincinnati, Ohio 45202**

**Continuation-in-part of Ser. No. 373,239, Apr. 29, 1982, abandoned. This application Nov. 15, 1983, Ser. No. 552,009**

**Int. Cl.³ A47K *13/00***

**U.S. Cl. 4—235** **13 Claims**





**1.** A universal child's toilet trainer usable with a conventional toilet seat and lid said lid having an inner planar surface without relieved areas comprising:

(a) an auxiliary toilet seat having a central aperture, the central aperture being of a smaller diameter than that of a conventional toilet seat, the auxiliary toilet seat in an operational position resting upon the conventional toilet seat, and in a storage position, lying flat against said inner planar surface of said lid;

(b) means for attaching the auxiliary toilet seat to the lid to allow movement of the auxiliary toilet seat between the storage and operational positions; and

(c) means on the attaching means for picking up the auxiliary toilet seat from the operational position in which the auxiliary toilet seat rests upon the conventional toilet seat and fixing the auxiliary toilet seat in the storage position adjacent said inner planar surface of said lid whereby the use of the child's toilet trainer does not interfere with the adult use and operation of the conventional toilet seat.

**10.** A universal child's toilet trainer usable with a conventional toilet seat and lid comprising:

(a) an auxiliary toilet seat having a central aperture, the central aperture being of a smaller diameter than that of a conventional toilet seat, the auxiliary toilet seat in an operational position resting upon a conventional toilet seat, and in a storage position, lying flat against the lid;

(b) a strip secured to the underside of the lid, the strip having a pair of projections extending perpendicularly from the underside of the lid;

(c) a pair of extension arms connecting the rear portion of the auxiliary toilet seat to the strip on the underside of the lid;

(d) a mounting pad on the outer end of each extension arm, each mounting pad having a cut-out, the cut-out fitting onto the pair of projections on the strip;

(e) a hook positioned on the strip so that the hook engages the open arm on the rear portion of the auxiliary toilet seat when the lid lies horizontally upon the auxiliary toilet seat,

the hook being capable of grasping the opening of the auxiliary toilet seat as the lid is raised, whereby the use of the child's toilet trainer by the child does not interfere with the adult use and operation of the conventional toilet seat.

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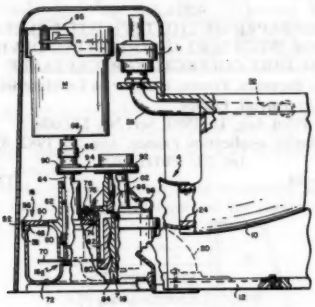
**4,516,280**

## WATER SAVING TOILET SYSTEM

**Wesley M. Tufts, Holliston, Mass., assignor to Control Fluidics, Inc., Greenwich, Conn.**

**Filed Apr. 27, 1984, Ser. No. 604,855**
**Int. Cl.³ E03D 9/10**
**U.S. Cl. 4—319** **8 Claims**



1. A toilet system comprising a toilet bowl having at the bottom a discharge opening, a treating chamber having an intake opening, a conductor connecting the discharge opening of the bowl to the intake opening of the treating chamber, a macerator in the treating chamber, means in the treating chamber for discharging treated effluent therefrom into a waste pipe, a motor, means drivably connecting the macerator and discharge pump to the motor for effecting simultaneous operation of the macerator and discharge pump, a valve connecting the bowl to a source of water operable to admit water to the bowl and means for sequencing operation of the valve and the motor to initiate operation of the discharge pump followed by operation of the valve to supply flush water to the bowl, terminate operation of the discharge pump and then close the valve.

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**4,516,281**

## SEWAGE TREATMENT DEVICE

**David B. MacPherson, Brunswick; Jay E. Paris, West Bass; Robert W. Foley, Cumberland Foreside; Martin W. Greinier, Westbrook, and David N. Pulsifer, Brunswick, all of Me., assignors to The Eastern Company, Naugatuck, Conn.**

**PCT No. PCT/US81/01363, § 371 Date May 11, 1983, § 102(e) Date May 11, 1983, PCT Pub. No. WO83/01267, PCT Pub. Date Apr. 14, 1983**
**PCT Filed Oct. 9, 1981, Ser. No. 495,150**
**Int. Cl.³ E03D 9/10**
**U.S. Cl. 4—319** **14 Claims**

1. A sewage treatment device for use with a toilet having a water flush input and a sewage output to treat with a disinfectant, comprising in combination:

a treatment tank;

connecting means for connecting the sewage output from the toilet to said treatment tank enabling water entering the water flush input of the toilet to transfer the sewage from the sewage output of the toilet to said treatment tank;

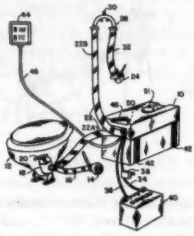
a disinfectant holding tank for holding the disinfectant;

a macerator blade disposed in said treatment tank;

a rotatable disinfectant pump for pumping disinfectant from said disinfectant holding tank to said treatment tank;

a motor for rotating said macerator blade within said treatment tank and for simultaneously rotating said disinfectant pump for macerating the sewage in said treatment tank and for simultaneously treating the sewage within said treatment tank with the disinfectant;

said macerator blade reducing the particle size of the sewage in said treatment tank concomitantly with said disinfectant pump metering a preselected amount of disinfectant in the treatment tank upon each rotation of said disinfectant pump;



timing means connected to electric power to said motor for macerating the sewage for a preselected period of time and for introducing a specified volume of disinfectant into said treatment tank; and

a discharge pump for discharging the treated sewage from said treatment tank.

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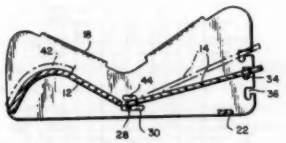
**4,516,282**

## SUPPORT FOR A PREMATURE INFANT

**Joan A. Topalian, 125 Newbritian Dr., Warwick, R.I. 02889, and Ronald L. Izen, Stillwater Rd., Smithfield, R.I. 02917**

**Filed Oct. 13, 1981, Ser. No. 310,456**
**Int. Cl.³ A61G 7/06**
**U.S. Cl. 5—72** **8 Claims**



1. A support for a premature infant comprising means defining a stationary convex surface of such dimensions as to accommodate the leg structure of an infant, means defining a relatively flat mobile surface dimensioned to accommodate the back structure of an infant, vertically spaced supports comprising spaced, parallel side wall panels to which said means defining the stationary surface is fixed, and a hinge for positioning the mobile surface at several predetermined angular positions relative to the stationary surface, said hinge comprising horizontal slots in the side wall panels and pin means at the proximal ends of the flat mobile surface engaged with the slots, said slots being dimensioned to permit rotation of the pin means and movement of the pin means along the slots and wherein the crest of the convex stationary surface occurs at approximately the location of the knee joints.

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**4,516,283**

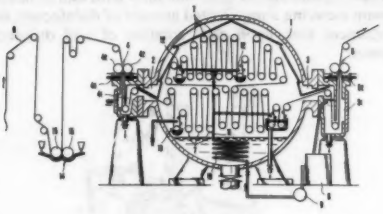
## METHOD FOR CONTINUOUS BLEACHING OF CLOTH

**Yoshikazu Sando, and Eiichi Nakano, both of Wakayama, Japan, assignors to Sando Iron Works Co. Ltd., Japan**

**Filed Mar. 12, 1984, Ser. No. 588,294**
**Claims priority, application Japan, Mar. 15, 1983, 58-42905**
**Int. Cl.³ D06B 3/12**
**U.S. Cl. 8—149.1** **1 Claim**

1. A method for continuous bleaching of a cloth in a high

pressure steamer with use of hydrogen peroxide, comprising soaking a cotton cloth to be bleached with a neutral or slightly alkaline hydrogen peroxide solution outside a high pressure steamer body, squeezing the cloth, introducing the resultant



cloth continuously in the steamer body maintained with wet-heat at a temperature above 100° C., and wet-heat treating the cloth therein while maintaining the total water content of the cloth to not less than 170% by applying hot water repeatedly to the cloth.

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**4,516,284**

**BRIDGING ARRANGEMENT FOR EXPANSION JOINTS IN THE CARRIAGEWAYS OF BRIDGES OR THE LIKE**

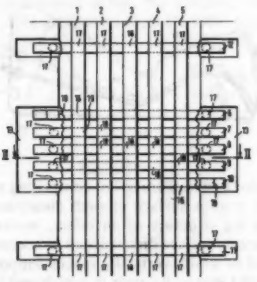
**Reinhold Huber, Bulach, Switzerland, and Waldemar Koster, Forsbach, Fed. Rep. of Germany, assignors to Kober AG, Glarus, Switzerland**

**Filed Apr. 4, 1983, Ser. No. 481,643**

**Claims priority, application Fed. Rep. of Germany, Apr. 5, 1982, 3212717**

**Int. Cl.³ E01D *19/06*; E01C *11/12***

**U.S. Cl. 14—16.5** **5 Claims**



1. Bridging arrangement for an expansion joint in a carriageway of a bridging structure and the like, wherein the expansion joint is located between edges of adjacent construction members formed with facing recesses, said construction members being spaced apart in the direction of said carriageway and said recesses therein extending in a direction transverse to said carriageway, a plurality of longitudinally extending bars, spaced from one another in said direction transverse to said carriageway, bridging said construction members and extending into said recesses thereof, a first plurality of slide support means in one of said recesses for all but one of said plurality of bars for slidably supporting the ends of said all but one bar in said one of said recesses, a second plurality of slide support means in the other of said recesses for all but one of said plurality of bars for slidably supporting the ends of all but one bar in said other of said recesses, a plurality of spaced apart plates adjacent the surface of the carriageway and extending longitudinally in a direction transverse to the direction of said carriageway solely above and spaced from said bars, each of said plates, to ensure uniform spacing between the plates and adequate support thereof for sustaining heavy vertical loads, having at least one rigid connection between the plates and said bars, and for at least a majority of said plates, at least one additional connection to said bars by a shear-deformable elastomeric member provided between the lower surface of the plate and the upper surface of the bar, said one of said plurality of bars in said one and in said other of said recesses being different bars connected at at least one end thereof to a shear-deformable elastomeric member.

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**4,516,285**

**PICK-UP SWEEPER OF THE TYPE WITH ELEVATING CONVEYOR WITH DIRT DISTRIBUTING DEVICE IN THE DIRT COLLECTING RECEPTACLE**

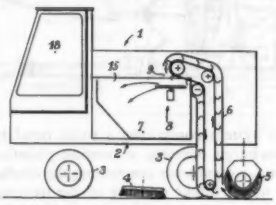
**Jean Pineau, Suresnes, France, assignor to Le Materiel de Voirie, Sarl, Argenteuil, France**

**Filed Aug. 11, 1983, Ser. No. 522,008**

**Claims priority, application France, Aug. 20, 1982, 82 14762**

**Int. Cl.³ E01H *1/04***

**U.S. Cl. 15—84** **12 Claims**



1. In a pick-up sweeper comprising at least one rotary brush for sweeping and collecting dirt on the ground, a dirt receptacle, an elevating conveyor having a lower input end associated with said rotary brush for receiving dirt collected thereby and an upper output end associated with said receptacle for discharging said dirt by gravity into said receptacle, and distributing means adjacent the upper output end of said elevating conveyor for evenly distributing said dirt into said receptacle, the improvement comprising said distributing means comprising a rotary disk located below the upper output end of said conveyor and having a substantially vertical axis of rotation, and driving means connected to said rotary disk for rotating same, said driving means including means for reversing the direction of rotation of the disk.

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**4,516,286**

**SEWER PIPELINE CLEANING APPARATUS**

**Patrick Crane, 24600 Dry Canyon Cold Creek Rd., Calabasas, Calif. 91302**

**Filed Jun. 6, 1983, Ser. No. 501,523**

**Int. Cl.³ B08B *9/02***

**U.S. Cl. 15—104.12** **2 Claims**

1. In a sewer pipeline cleaning apparatus having a hydraulic motor with a drive shaft, an inlet for connecting a high pressure hydraulic fluid to drive a sewer cleaning tool attached to said drive shaft the improvement comprising:

a rigid frame formed of first and second cylindrical rings connected by a plurality of stiffening struts;

clamp means removably clamping said hydraulic motor in said first cylindrical ring;

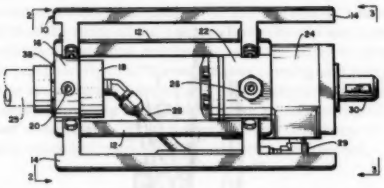
a fluid connecting adaptor having a fluid inlet and outlet and rearwardly facing orifices connected to a passageway through said fluid connecting adaptor;

connecting means connecting a high pressure fluid supply to

the inlet of said fluid connecting adaptor, said high pressure fluid providing a thrust through said rearwardly facing orifices;

conduit means connecting said outlet from said fluid connecting adaptor to said hydraulic motor inlet;

second clamp means removably clamping said fluid connecting adaptor in said second cylindrical ring separately from said hydraulic motor;



a plurality of skids bolted to said struts for holding said frame with said hydraulic motor and fluid connecting adaptor spaced from the interior wall of a sewer pipeline being cleansed;

whereby the hydraulic motor, fluid connecting adaptor and skids may be separately removed for repair or replacement.

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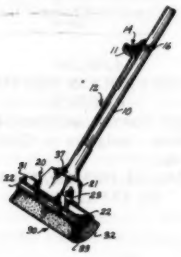
**4,516,287**

## ANGLED ROLLER MOP

**Robert S. Johnson; Paul E. Fletcher; William S. Benjamin, all of Seattle, and John I. Zsitvay, Mercer Island, all of Wash., assignors to The Lighthouse for the Blind, Incorporated, Seattle, Wash.**

**Filed Apr. 2, 1984, Ser. No. 595,710**
**Int. Cl.³ A47L *13/144***
**U.S. Cl. 15—119 A** **8 Claims**



1. A mop, comprising:

an elongate handle having a longitudinal axis;

a wringer assembly connected to said handle, said assembly including:

a pair of spaced-apart ends, each of said ends having openings that cooperatively define a retraction channel that is oriented about a retraction axis, said channel being open at its lower end and closed at its upper end, said retraction axis being oriented transverse to the longitiudinal axis of said handle;

a pair of rollers mounted between said ends in substantially parallel relation to one another on opposite sides of the open lower end of said channel; and

a bearing surface disposed adjacent the closed end of said retraction channel;

a cleaning assembly having a compressible cleaning element connected to a retainer, said cleaning assembly being mounted in the retraction channel so that said cleaning element extends downwardly between said rollers, said cleaning assembly being adapted to move along the retraction axis in a transverse direction relative to the longitudinal axis of said handle between an open position, in which the retainer of said cleaning assembly engages said rollers, and a closed position, in which said retainer engages the closed end of said channel; and

a retraction rod connected to the retainer of said cleaning assembly, said rod being operable to move the cleaning assembly in said retraction channel in a transverse direction relative to the longitudinal axis of said handle, said rod having an angled portion that is adapted to slidingly engage said bearing surface during a portion of the movement of the cleaning assembly between the open and closed positions.

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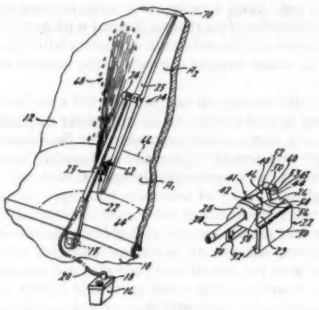
**4,516,288**

## WINDSHIELD WASHER DUAL SPRAY NOZZLE

**Wojciech L. Fizyta, Livonia, and Algen K. Kaumeheiwa, Southfield, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

**Filed May 7, 1984, Ser. No. 607,897**
**Int. Cl.³ B60S *1/46***
**U.S. Cl. 15—250.04** **3 Claims**



1. A vehicle windshield cleaning assembly including a wiper blade oscillatable through an arcuate path across the outer surface of the windshield to wipe upper, intermediate, and lower areas of the same, a washer nozzle mounted on said windshield cleaning assembly and movable therewith, said washer nozzle comprising a base having an uninterrupted surface, a first solid wall upstanding from said base having a transverse frontal wall surface extending vertically from said base surface, an orifice extending through said frontal wall surface such that the principal axis of said orifice is normal to said frontal wall surface, means for supplying fluid under pressure to said orifice for discharge therefrom, a second longitudinally extending wall upstanding from said base surface disposed substantially perpendicular to said first wall, said second wall having its upper surface parallel with said base surface, said second wall forming first deflecting surface means disposed in a plane oriented at an obtuse angle relative to said base and an acute angle relative to said first solid wall intersecting the path of a stream of solvent discharged from said orifice, and means for supplying a solvent under pressure to said orifice, the improvement wherein said first deflecting surface means having a notched-out portion therein defining a second transverse deflecting surface and a third skewed deflecting surface, said first deflecting surface means in the form of a pair of fore and aft coplanar deflecting surfaces on either side of said notched-out portion such that said fore and aft surfaces are located proximate and distal respectively, from said orifice, said third skewed deflecting surface intersecting said fore and said transverse deflecting surfaces, whereby said fore and aft deflecting surfaces intersecting and diverting a primary spray of said stream of fluid generally axially upwardly toward said upper and intermediate areas of the windshield and said second

and third surfaces intersecting and dispersing a secondary spray said stream of fluid generally normally toward said lower area of the windshield.

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**4,516,289**

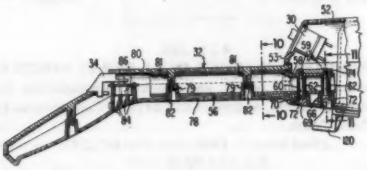
## HANDLE CONSTRUCTION FOR FLOOR CARE APPLIANCE

**William R. Sumerau, Easley, S.C., assignor to The Singer Company, Stamford, Conn.**

**Filed Apr. 30, 1984, Ser. No. 605,330**

**Int. Cl.³ A47L *9/32***

**U.S. Cl. 15—410** **4 Claims**



1. A handle for a floor care appliance comprising a housing including a rigid main housing, said main housing having an internally oriented surface thereof formed with a cavity having at least one aperture therethrough extending from the external surface of the main housing through to the internal surface of the cavity;

a handle tube having on one end thereof a surface complimentary to said cavity and an oppositely disposed flatted surface, at least one hole normal to said flatted surface and through said flatted surface and said surface complimentary to said cavity substantially coaxial with said aperture through said cavity of said main housing;

at least one reinforcement tube received internally of said handle tube in said one end, said at least one reinforcement tube having the axis of its internal diameter substantially coaxial with the axis of said hole and said aperture; and

a handle mounting plate retained on said flatted surface of said handle tube externally thereof and including at least one tapped hole therethrough; and,

at least one screw extending through said at least one aperture in said main housing, through said at least one hole in said handle tube and said internal diameter of said at least one reinforcement tube into said at least one tapped hole of said handle mounting plate for retaining said handle tube affixed to said main housing.

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**4,516,290**

## APPARATUS FOR THE REMOVAL OF ENTRAILS OF SLAUGHTERED BIRDS

**Martinus P. G. van Mil, Boxmeer, Netherlands, assignor to Stork PMT B.V., Netherlands**

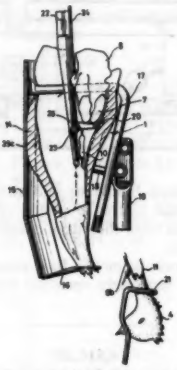
**Filed May 11, 1983, Ser. No. 493,404**

**Claims priority, application Netherlands, May 17, 1982, 8202031**

**Int. Cl.³ A22C *21/06***

**U.S. Cl. 17—11** **6 Claims**

1. Apparatus for removing the heads and entrails of slaughtered birds comprising means for positioning the birds and supporting them at a fixed location with their legs arranged uppermost and their necks and heads lowermost, an oblong carrier adapted to be moved into and out of an internal cavity of each bird at the fixed location and carrying near its leading end a spoon-shaped extractor member which is rockable about a transverse pivot axis and is provided with a central cut-out, the spoon-shaped extractor member after being moved with said carrier into said cavity being adapted to pivot to a position in which it is at an angle to the carrier so that when the carrier is retracted from said cavity the spoon-shaped extractor member will extract a packet of entrails from each bird, and a head pulling bow which is swingable toward and from the neck of each bird and adapted to straddle the neck and exert a pulling force on the neck to separate the head and part of the neck from each bird together with the gullet and windpipe, and means controlling the movement of said carrier and head pulling bow in such a manner that the spoon-shaped extractor member while positioned at said angle to the carrier removes the packet of entrails from said cavity of each bird while the head pulling bow is removing the head and part of the neck from each bird with the gullet and windpipe attached, and said



means for positioning the birds and supporting them at said fixed location comprising a concave support plate which receives the breast of each bird and which is biased in one direction by a spring, and the concave support plate at its bottom having two projecting support lips adapted to cooperate with two U-shaped bows disposed above the lips and being movable toward and away from the support plate, the uppermost of the two bows having a closed end toward the support plate and the lower bow having an open end toward the support plate.

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**4,516,291**

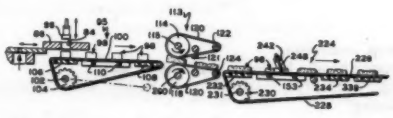
## APPARATUS AND PROCESS FOR FORMING MEAT PATTIES

**Robert D. Goldberger, Wayzata, and James F. Stower, South St. Paul, both of Minn., assignors to Goldberger Foods Inc., Minneapolis, Minn.**

**Filed May 31, 1983, Ser. No. 499,227**

**Int. Cl.³ A22C *7/00***

**U.S. Cl. 17—32** **25 Claims**



1. An apparatus for forming meat patties from ground meat, the formed patties having extended substantially parallel top and bottom surfaces and a peripheral side wall,

said apparatus comprising a mold plate with a mold chamber therein, each such chamber having a side wall including spaced apart peripherally distributed recesses,

a mold closure means to seal off the mold cavity in the mold plate,

said apparatus having an injection duct extending therethrough into the mold chamber,

a storage chamber for the ground meat communicating through the injection duct with the mold chamber,

a pump housing including a meat pumping means for propelling the ground meat from the storage chamber through

the duct into the mold chamber at a pressure of about 70 to 80 p.s.i. within the mold chamber to thereby compress the meat within the mold chamber to a predetermined density,

a means establishing relative motion between the mold plate and the mold closure means to open the mold chamber in the mold plate after the chamber has been filled,

means to strip the patty from the mold chamber when the mold chamber is open,

pressure members engageable with the top and bottom surfaces of the stripped out patty to force the top and bottom surfaces toward one another causing the patty to spread out peripherally in all directions and causing said patty to have an irregular outline and to fracture at the edge thereby providing radially extending peripherally distributed compression fractures around the periphery of the patty extending partially toward the center thereof.

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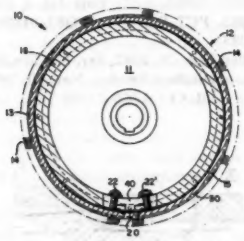
**4,516,292**

## WIRE-COVERED DOFFER FOR SLIVER HIGH PILE FABRIC KNITTING MACHINES

**Earl R. Quay, Orangeburg, S.C., assignor to Mayer, Rothkopf Industries, Inc., Orangeburg, S.C.**

**Filed Oct. 3, 1983, Ser. No. 538,142**
**Int. Cl.³ D01G** *15/14*
**U.S. Cl. 19—112** **15 Claims**




1. A doffer for feeding fibers to the needles of a sliver high pile fabric knitting machine, said doffer including a smooth-peripheried doffer roll mounting wire-covered card clothing, characterized by

(a) a segment of card clothing enveloping the periphery of the doffer roll and having spaced ends disposed in abutting relation on said roll and

(b) fastening means for tightly securing the segment of card clothing to the doffer roll, said fastening means comprising

(i) a pair of clamps mounted on the doffer roll, each clamp having a plate disposed on the periphery of the doffer roll,

(ii) each clamp having a row of impaling points mounted on the plate and extending transversely relative to the periphery of the doffer roll for engaging one of the two abutting ends of the segment of card clothing, and

(iii) clamp securing means affixing each clamp to the doffer roll.

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**4,516,293**

## CLAMPING STRUCTURE

**Anthony V. Beran, 1472 La Loma Dr., Santa Ana, Calif.**

**Continuation-in-part of Ser. No. 256,698, Apr. 23, 1981. This application Apr. 25, 1983, Ser. No. 488,057**
**Int. Cl.³ B65D** *63/00*
**U.S. Cl. 24—16 PB** **7 Claims**

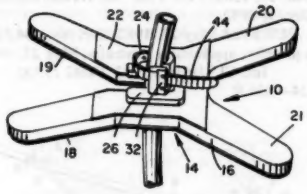
1. In a locking structure for a clamp:

bolt means for locking cooperation with a surface conformation on a keeper;

a keeper formed by two members spaced to provide an opening between them;

a latch carried by the keeper and resiliently mounted on one of said members for movement in said opening;

said latch being biased to a position in said opening such that entry of the bolt means into the space between said members requires mating of said conformation and said latch or retraction of the latch;




said members being capable of being spread apart and in which a projection extends into said space from one of said members sufficiently to require spreading of said members to permit entry of the bolt means into said space by arranging said conformation and latch in mating position.

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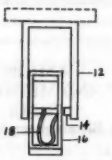
**4,516,294**

## SELF LOCKING HOLDER FOR AN ITEM OF JEWELRY

**Dilworth Sanderson, 79 Waller Ave., White Plains, N.Y. 10605**

**Filed Mar. 10, 1982, Ser. No. 356,859**
**Int. Cl.³ A41B** *7/00*
**U.S. Cl. 24—41** **10 Claims**




1. A self-locking holder for a cuff link comprising, in combination:

(a) a U-shaped stem adapted to hold thereon the cuff link said stem having two side members defining an opening therebetween;

(b) a pin member defining an axis extending between said side members across said opening, said pin member having a cylindrical non-circular cross-section along a first portion of its length near one side member and a cylindrical cross-section along a second portion of its length near the other side member;

(c) a locking member, slidably and rotatably arranged on said pin member within said opening, said locking member having a hole therein for receiving said pin member, the cross-section of said hole on the side thereof adjacent said one side member matching said non-circular cross-section, said locking member being smaller in width than the distance between said two side members; and

(d) spring means arranged for biasing said locking member toward said one side member; whereby said locking member may be rotated on said pin member by first sliding it along the axis of said pin member toward said other side member away from said first portion of said pin member, and whereby said locking member is prevented from rotating on said pin member when it is positioned adjacent said one side member with the matching cross-section of

said hole disposed over said first portion of said pin member.

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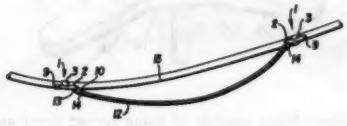
**4,516,295**
**SECUREMENT MEANS**

**Donald G. McCoy, 69 Penfold Rd., Rosslyn Park, Australia (5072)**

**PCT No. PCT/AU82/00084, § 371 Date Jan. 27, 1983, § 102(e) Date Jan. 27, 1983, PCT Pub. No. WO82/04235, PCT Pub. Date Dec. 9, 1982**
**PCT Filed May 27, 1982, Ser. No. 464,515**
**Claims priority, application Australia, May 27, 1981, PE9064**
**Int. Cl.³ B63B *15/02*; F16G *11/00***
**U.S. Cl. 24—136 R** **9 Claims**



1. Apparatus for releasable attachment at spaced apart distances of each end of a rope to a sail board wishbone boom for use with a "Hawaiian Harness", the apparatus comprising a frame adapted to be locatable alongside the boom, and a pliable member adapted to engage around the boom and inter-engage with the frame member, and rope holding means on the frame arranged to facilitate pulling of the frame by a rope attached thereto along the direction of elongation of the boom, the frame and pliable member being so arranged that such pulling can result in a tightening of the pliable member about the boom and tight gripping thereby of the boom whereas the apparatus can be released for relocation at another location along the boom by urging the frame in a direction contra to the pulling direction of the rope.

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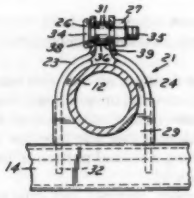
**4,516,296**
**TUBING CLAMP AND METHOD OF MAKING THE SAME**

**Clarence A. Sherman, Birmingham, Mich., assignor to ZSI, Inc., Redford, Mich.**

**Filed Oct. 5, 1983, Ser. No. 539,219**
**Int. Cl.³ B65D *63/06*; F16L *3/08***
**U.S. Cl. 24—279** **4 Claims**



1. A clamp for securing a cylindrical member comprising a first clamp half and a second clamp half having inner and outer sides for encircling the cylindrical member, the first clamp half and second clamp half having means at their ends for interlocking with a channel member and having apertures of a substantially equal diameter formed at their opposite end for receiving a stud, said stud comprising an elongated member having a longitudinal axis, a head portion at one end abuttingly engaging the outer side of the first clamp half and externally threaded portion at the opposite end for receiving an internally threaded nut abuttingly engaging the outer side of the second clamp half to tighten the first clamp half and second clamp half about the cylindrical member, and an elongated spacer coaxial with the longitudinal axis of said elongated member and integral with said elongated member interposed between said head portion and said externally threaded portion, said spacer having a diameter greater than the diameter of said apertures forming first and second spaced apart parallel shoulders perpendicular to the longitudinal axis of said elongated member, the inner side of the first clamp half being squarely abutted against the first shoulder and inner side if the second clamp half being squarely abutted against the second shoulder when said internally threaded nut is tightened against the outer side of the second clamp half, said first and second shoulders preventing the first clamp and second clamp half from being tightened to the extent that they damage the conduit or bend the side,

said head portion being pressed against the outer side of said first clamp half tightly restricting the first clamp half between said head portion and said first shoulder, said stud being restrained from turning within the aperture in said first clamp half, wherein said head portion further comprises a serrated section adjacent said first shoulder receivable by said aperture in said first clamp half, said serrated section preventing said stud from turning within said aperture.

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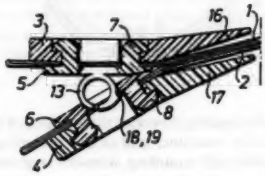
**4,516,297**
**CLOTH FASTENER**

**Klas A. Pettersson, Läggestavägen 16, S-124 31 Bandhagen, Sweden**

**PCT No. PCT/SE82/00405, § 371 Date Jul. 1, 1983, § 102(e) Date Jul. 1, 1983, PCT Pub. No. WO83/01889, PCT Pub. Date Jun. 9, 1983**
**PCT Filed Nov. 26, 1982, Ser. No. 516,605**
**Claims priority, application Sweden, Nov. 30, 1981, 8107133**
**Int. Cl.³ A44B *21/00***
**U.S. Cl. 24—498** **6 Claims**



1. A fastener assembly for releasably securing a cloth article (1) and another article (2) together, comprising:

(a) a first fastener member including inner and outer elements (5,3; 20,3) adapted to be snapped together through an aperture (9) in the cloth article with the cloth article clamped between them,

(b) a resiliently deformable projection (13; 22) extending outwardly from the inner element and defining a hook portion (18; 24) along one outer side thereof,

(c) a second fastener member (4,6; 4,21) adapted to be mounted to another article,

(d) an aperture (12; 23) defined in the second fastener member, said aperture being configured to retainably accommodate the projection on the inner element of the first fastener member and having an engagement portion (19; 25) along one inner side thereof adapted to lockingly coact with the hook portion of the projection, the projection being deformably insertable through the aperture by bringing the first and second fastener members together along a common abutment line proximate the hook and engagement portions and then pivoting them relative to each other in a first sense to effect a snap fit, and

(e) a lever portion (16) extending laterally outwardly from the outer element as a substantially planar projection thereof and integral therewith, the snap fit being releas-

able by pressing the lever portion towards the second fastener member to pivot the first and second fastener members relative to each other in a second sense opposite the first sense.

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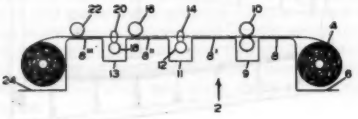
**4,516,298**

## CANE SINGEING APPARATUS

**John C. Ashley, and Bernard Calhoun, both of Lansing, N.C., assignors to Armstrong World Industries, Inc., Lancaster, Pa.**

**Filed Dec. 21, 1983, Ser. No. 564,035**
**Int. Cl.³ D06C *9/02***
**U.S. Cl. 26—3** **1 Claim**




1. In an apparatus for singeing cane material, the structure comprising:

(a) a table structure with an upper work surface, several recessed areas in the upper work surface, and a dispensing compartment at one end of the table with a receiving compartment at the other end of the table,

(b) in one recess of the table adjacent the dispensing compartment, a dual roll drive means is positioned with the lower surface of the upper roll and the upper surface of the lower roll defining a nip and the nip being positioned in the plane of the upper work surface of the table,

(c) adjacent the drive means in another recessed area of the table, a gas manifold is positioned below the surface of the upper work surface of the table,

(d) a second gas manifold in position in another recessed area with a section of the upper work surface positioned between the two recessed areas having the gas manifolds, and

(e) two hold down roll means resting on the upper work surface adjacent the recess with the second manifold means whereby a chair cane seat may be moved from the dispensing compartment by the drive means and slipped along the upper work surface of the table through flames generated by the first and second manifolds to singe protruding cane fiber and remove the protruding cane fiber from the body of the chair cane seat prior to the time the chair cane seat is rolled up in the receiving compartment.

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**4,516,299**

## METHOD AND APPARATUS FOR MAKING SINGLE CRANKS FOR BUILT-UP CRANKSHAFTS USED IN LARGE ENGINES

**Wayne A. Martin, Pittsburgh, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.**

**Filed May 9, 1983, Ser. No. 493,119**
**Int. Cl.³ B21K *1/08***
**U.S. Cl. 29—6** **8 Claims**

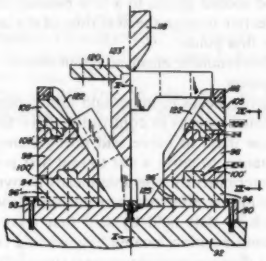
1. A method of making a crank having a pair of spaced generally parallel crank arms and an integral throw pin joining said arms,

said method comprising:

(a) providing an elongated generally flat metal workpiece having longitudinal end portions of about the desired final thickness and shape of said crank arms and a central portion with a saddle-shaped area protruding from a lower broad face, thereof,

(b) heating said workpiece to a temperature suitable for a first-forming operation,

(c) placing the heated workpiece in a first-forming die so that lower edges of longitudinal ends of the workpiece rest substantially at the point of tangency in a horizontal direction of downwardly curved configurations at the upper ends of opposed sidewalls forming a V-shaped cavity in said die, and forming the heated workpiece by lowering a first top punch into an upper broad face of the central portion of the workpiece, bending the workpiece into the shape of the cavity in said die, said opposed sidewalls being tilted upwardly from horizontal at an angle within the range of about 35° to about 65°, the lower end of said top punch having opposed lower surfaces substantially parallel to said opposed sidewalls of the die, the base of said cavity in the die having a shape substantially the same as the saddle-shaped area of the workpiece,



(d) reheating the V-shaped workpiece to a temperature suitable for a second-forming operation, and

(e) forming the reheated workpiece to a generally parallel arm configuration by lowering a second-top punch into the upper broad face of the central workpiece portion forcing the workpiece into a second-forming die having a cavity extending downwardly therein, the upper portion of said cavity having opposed surfaces sloped downwardly and inwardly at substantially the same angle as the arms of the V-shaped workpiece, the lower portion of said cavity having generally parallel sidewalls joining the spaced inner ends of the sloped upper die surfaces.

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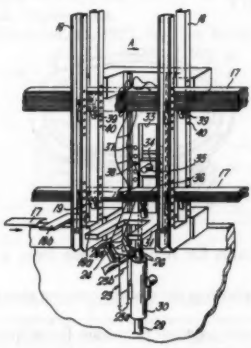
**4,516,300**

## APPARATUS AND A METHOD FOR ASSEMBLING SLATS OF A VENETIAN BLIND

**Adrianus J. C. Gaillard, Zwijndrecht, Netherlands, and Richard N. Anderson, Owensboro, Ky., assignors to Hunter Douglas International N.V., Curacao, Netherlands Antilles**

**Filed Aug. 1, 1983, Ser. No. 518,911**
**Int. Cl.³ B23P *19/04***
**U.S. Cl. 29—24.5** **11 Claims**



1. An assembly apparatus for assembling slats of a venetian blind in the ladder means of the blind, said apparatus comprising, in combination:

(a) a first guide for guiding slat material in a slat feed direction;
(b) slat feeding means for moving slats through said apparatus;
(c) at least two assembly stations, each assembly station including:
(i) a second guide for guiding a slat or a slat material assembled in said ladder means in a direction transverse to said feed direction;
(ii) a lifting element for moving each slat, after assembly into said ladder means in said transverse direction along said second guide, to a first position and by a distance effective to align the next rung of the ladder means with the first guide;
(iii) first retaining means to retain slats so lifted in said first position;
(iv) drive means to move said lifting element;
(v) control means to control the drive means effective to cause them to move said lifting element only by said distance, to move a slat to said first position;
(vi) intermittently operable means to over-ride said control means, effective to enable said drive means to lift a stack of slats held by said first retaining means to a second position located beyond said first position and by a distance whereby several rungs of the ladder means move past the level of said first guide and effective to disable said slat feeding means during the time said drive means moves said lifting element between said first and second positions; and
(vii) second retaining means at said second position to retain a stack of slats so lifted to said second position.

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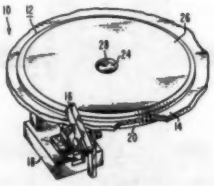
**4,516,301**

## METHOD AND APPARATUS FOR REMOVING FLASH FROM A MOLDED RECORDED DISC

**Harry H. Westerman, Jr., Danville, and John J. Prusak, Indianapolis, both of Ind., assignors to RCA Corporation, Princeton, N.J.**

**Filed Nov. 8, 1982, Ser. No. 439,928**
**Int. Cl.³ B23B** *5/00*
**U.S. Cl. 29—27 C** **15 Claims**



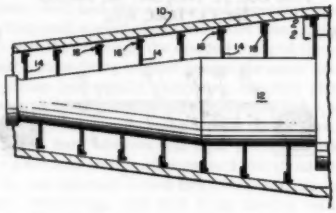
5. An apparatus for removing flash from a molded disc comprising:
means for supporting the disc for rotation about the center of the disc,
a knife mounted adjacent the means for supporting the disc,
means for moving said knife across a portion of the flash of a disc so as to cut through said portion of the disc, and
means for moving the knife inwardly along a line having a component radially inwardly of the disc.

**4,516,302**

## FIELD REPLACEABLE SCREW CONVEYOR INSERTS

**Edmund C. Chulada, Londonderry, and David A. Nelson, Wilton, both of N.H., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Division of Ser. No. 289,042, Jul. 31, 1981, Pat. No. 4,419,090.**
**This application Aug. 15, 1983, Ser. No. 523,164**
**Int. Cl.³ B21K** *3/04*; **B23P** *15/02, 15/04*
**U.S. Cl. 29—156.8 R** **1 Claim**



1. A method of forming replaceable inserts for placement on the outer edges of conveyor helical flights comprising: making a metal ring-shaped annular member of the same material as the conveyor flights, depositing wear-resistant, hard-facing material on one radial surface of said annular member in a manner to simultaneously form and fuse the wear-resistant, hard-facing material to the annular member; machining the metal part of the annular member to the proper dimensions; radially cutting the machined annular member into a plurality of segmental inserts; and mounting the segmental inserts on the periphery of the feed-side conveyor helical flights with the radially cut sides of the segmental inserts adjacent each other.

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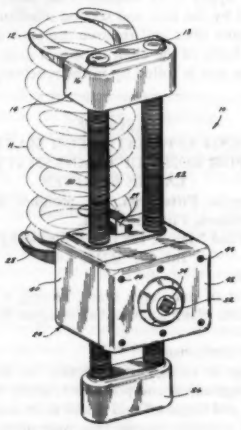
**4,516,303**

## SPRING COMPRESSOR

**Kenneth D. Kloster, 6649 Millridge, Maumee, Ohio 43537**

**Filed Mar. 16, 1983, Ser. No. 475,906**
**Int. Cl.³ B23P** *19/04*
**U.S. Cl. 29—227** **5 Claims**



1. An apparatus for compressing a helical coil spring comprising:
a pair of spaced apart spring engaging shoes for receiving spaced apart helical portions of the spring;
a pair of spaced apart elongate externally threaded guide shafts each having a longitudinal axis;

means for mounting said guide shafts in spaced apart, generally parallel relationship and for preventing rotative movement of said guide shafts;

means for securely mounting one of said spring engaging shoes relative to said guide shafts; and

means for supporting the other one of said spring engaging shoes in facing relationship with said one shoe, said support means including a housing mounted for axial movement along said guide shafts and a separate internally threaded sleeve threadedly mounted about each of said guide shafts, means for resisting axial movement of each of said sleeves along said guide shafts relative to said housing, and rotatable input means for simultaneously rotating said sleeves relative to said housing about the longitudinal axes of said guide shafts whereby rotation of said input means in one direction causes said support means to move along said guide shafts in one direction and rotation of said input means in an opposite direction causes said support means to move along said guide shafts in an opposite direction.

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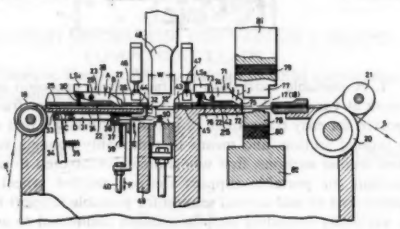
**4,516,304**

## METHOD AND APPARATUS FOR APPLYING REINFORCING PIECES TO SLIDE FASTENER CHAIN

**Hiroshi Yoshida; Shunji Akashi, both of Kurobe, and Kazuki Kuse, Toyama, all of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Apr. 27, 1983, Ser. No. 489,124**
**Claims priority, application Japan, Apr. 28, 1982, 57-71761**
**Int. Cl.³ B23P *21/00***
**U.S. Cl. 29—408** **5 Claims**



1. A method of applying reinforcing film pieces of thermoplastic synthetic resin to a slide fastener chain having a pair of continuous thermoplastic stringers with interengaged coupling elements mounted on thermoplastic core threads thereof for production of slide fasteners having a separable bottom end stop, the fastener chain having successive spaced between the successive spaced pairs of coupling element groups, said method comprising the steps of:

(a) moving the fastener chain longitudinally along a first path;

(b) automatically temporarily stopping the movement of the fastener chain every time each of the successive spaced pairs of blank tape portions arrives at a first working station;

(c) feeding a continuous strip of the thermoplastic synthetic resin longitudinally, in uniform steps equal to the length of one reinforcing film piece, to the first working station along a second path extending perpendicularly to the first path;

(d) automatically severing a reinforcing film piece from the continuous strip each time when the latter has been fed said length;

(e) automatically placing the severed a reinforcing film piece on the fastener chain across one of the successive spaced pairs of blank tape portions at the first working station;

(f) applying pressure and ultrasonically-generated heat only to the inner marginal edges of said one pair of blank tape portions and to the abutting portion of the reinforcing film piece thereon to partially fuse the reinforcing film piece to said one pair of blank tape portions and to shape the fused marginal portions along the core cords as a pair of pin-like members subsequently receptive of a pin and a box of the separable bottom end stop;

(g) restarting the movement of the chain and piece of film in the first path and again automatically temporarily stopping the movement at a second working station; and

(h) applying reduced pressure and heat to said one pair of blank tape portions and said reinforcing film piece thereon at their superposed non-fused areas to fuse the same.

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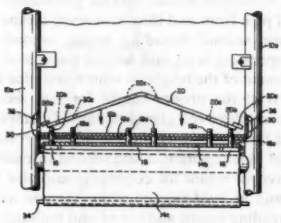
**4,516,305**

## WEBBING TENSIONING METHOD

**Goetz W. Unger, East Greenville, Pa., assignor to Knoll International, Inc., New York, N.Y.**

**Division of Ser. No. 330,948, Dec. 15, 1981, Pat. No. 4,431,229.**
**This application Sep. 6, 1983, Ser. No. 529,341**
**Int. Cl.³ B23P *11/02***
**U.S. Cl. 29—448** **2 Claims**



1. A method of stretching and securing upholstery fabric in place in a rigid framework of a chair or the like comprising positioning a pair o bars in pockets along opposite edges of the fabric, articulatedly securing the bars at corresponding ends thereof to spaced portions of said rigid framework, forcing apart the other ends of the bars by straightening a bent rigid elongated support between said other ends to stretch the fabric, and securing said other ends of said bars and said straightened rigid elongated support in said forced-apart condition to said spaced portions of said fixed framework to maintain said fabric in stretched condition.

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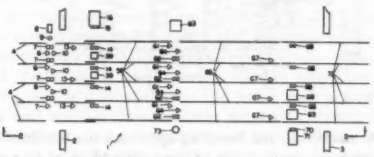
**4,516,306**

## SEMI-AUTOMATIC PIPE THREADING PLANT AND APPARATUS THEREFOR

**Robert J. Albert, Harvey, La., assignor to Tubular Threading Incorporated, Marrero, La.**

**Filed Oct. 13, 1982, Ser. No. 433,967**
**Int. Cl.³ B23P *41/04***
**U.S. Cl. 29—564.7** **6 Claims**



1. A semi-automated plant for threading pipe, said plant comprising a building, first conveyor means for receiving outside of said building pipe to be threaded, aligning said pipe and conveying said pipe to inside said building, with said pipe entering said building at a side thereof, with the axial length of the pipe generally parallel to that building side and at least one end of said pipe aligned with respect to a point on that building

side, a first threading means for threading the exterior of a first end of said pipe at a location higher than the height of the first conveyor means at said building side, first pneumatic lift means for lifting said pipe from said first conveyor to the general level of said first threading means, first hydraulic lift means cooperating with said first pneumatic lift means for fine adjustment of the height to which said pipe is lifted so that said pipe is at the proper height for said first threading means, first three roll clamp means for clamping said pipe in position to be threaded by the use of three rollers, while permitting said pipe to rotate in said first threading means, bucking means for applying a coupling to the threaded first end of said pipe, second conveyor means for conveying said pipe from said first threading means to the vicinity of said bucking means, second lift means for lifting said pipe from said second conveyor means to the proper height for said coupling to be applied, second threading means for threading the exterior of the second end of said pipe, third conveyor means for conveying said pipe from said bucking means to the vicinity of said second threading means, said second threading means at a location higher than the height of said third conveyor means, second pneumatic lift means for lifting said pipe from said third conveyor means to the general level of said second threading means, second hydraulic lift means cooperating with said second pneumatic lift means for fine adjustment of the height to which said pipe is lifted so that said pipe is at the proper height for said second threading means, second three roll clamp means for clamping said pipe in position to be threaded by the use of three rollers, while permitting said pipe to rotate in said second threading means, and fourth conveyor means for conveying said pipe with each end threaded and at least one coupling thereon away from said second threading means and out of said building, with the pipe being maintained while in said plant generally parallel to said side of said building.

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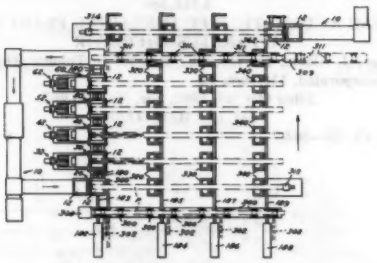
**4,516,307**

## PIPE AND BAR STOCK TRANSFER AND MACHINING SYSTEM AND APPARATUS

**Frederick H. Beard, Farmington Hills; Maynard M. Moyer, Rochester, and Clarence Smith, Jr., Oak Park, all of Mich., assignors to Snyder Corporation, Detroit, Mich.**

**Filed Mar. 15, 1982, Ser. No. 358,465**
**Int. Cl.³ B23B *41/00***
**U.S. Cl. 29—564** **11 Claims**



1. A machining and handling apparatus for the finishing of work elements in the form of long cylindrical or rectangular bars or tubes which comprises:

(a) a plurality of pallet registry stations positioned along a primary lineal path adjacent a plurality of machining consoles,

(b) pallet means movable along said path in step-by-step progression to said registry stations,

(c) means on each said pallets to locate and clamp the one end of a work element disposed normal to said path,

(d) a plurality of parallel transfer bars spaced laterally from said path,

(e) retractable first means adjacent said bars in substantial alignment with said registry stations in a direction normal to said path selectively operable to support the remaining portion of said work element in an idle position in a predetermined plane for a machining operation, and

(f) second means in a transfer position to support said work element in said plane independent of said first means for transfer movement in the direction of said path from one station to another in said predetermined plane.

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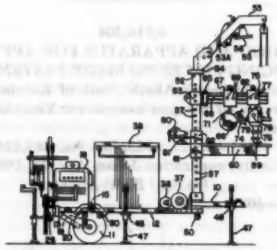
**4,516,308**

## PORTABLE WORKSHOP

**John A. Urban, 423 S. Woodlawn, Wheaton, Ill. 60187**

**Filed Apr. 18, 1983, Ser. No. 486,215**
**Int. Cl.³ B23Q *39/06***
**U.S. Cl. 29—564** **8 Claims**



1. A portable workshop for facilitating precision machine work at various job sites including a mobile trailer frame supported for easy transport to a job site including a first section, a second section, and means to removably connect said first and second sections; first wheel means connected to said first section for portable support thereof; second wheel means connected to said second section for portable support thereof; a vertically-extending support column connected to and supported by said first section of said trailer frame; a first platform associated with said first section of said trailer frame adapted to support a tool container thereon; a second platform associated with said second section of said trailer frame adapted to support welding equipment or the like, said section being easily detachable from said first section for removal therefrom at a job site; a mounting arm; means to connect said mounting arm to said vertical support at any of a number of predetermined heights; means to adjust said mounting arm from one height to another, said arm adapted to function as a mounting support for any of a number of power tools adapted to be adjustably positioned along and supported by said arm; and hitching means attached to said trailer frame to provide for connecting of said trailer frame to a towing vehicle.

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**4,516,309**

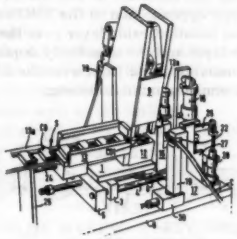
## APPARATUS FOR ASSEMBLING AN ELECTRICAL CONNECTOR TO A CABLE

**Donald G. Clark, Bideford, England, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Apr. 13, 1984, Ser. No. 599,854**
**Int. Cl.³ H01R *43/04***
**U.S. Cl. 29—564.4** **5 Claims**

1. Apparatus for assembling an electrical connector to an end portion of a multiconductor electrical cable having a cable jacket, the apparatus comprising a table, a cable gripper mechanism beside the table, a cable jacket stripper mechanism on the table, a press on the table beside said stripper mechanism, for assembling a connector to the end portion of the cable, a connector feed mechanism on the press, for intermittently

feeding a strip of electrical connectors thereto to position a leading connector of the strip in the press, means for releasably holding the leading connector in the press, means for translating the table in two opposite directions along first and second mutually perpendicular paths with respect to the cable gripper mechanism, drive means for said gripper, said stripper and said feed, mechanisms and said holding and said translating means,



and control means for so cycling said drive means that the end portion of a cable held by the cable gripper mechanism is presented to the stripper mechanism whereby such mechanism strips the jacket from said end portion; said leading connector is held in the press by the connector holding means; said leading connector is moved onto said stripped end portion; and the press is actuated to assemble said leading connector to said stripped end portion.

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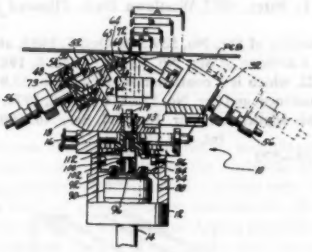
**4,516,310**

## CUT-CLINCH MECHANISM FOR VARIABLY SPACED COMPONENT LEADS

**Vitaly Bandura, Danvers, Mass., assignor to USM Corporation, Farmington, Conn.**

**Filed Feb. 25, 1983, Ser. No. 469,788**
**Int. Cl.³ B21F *1/00***
**U.S. Cl. 29—566.3** **5 Claims**



1. A mechanism for cutting and clinching variable spaced leads of electrical components that have been inserted into a printed circuit board comprising of:

(a) a support housing;

(b) a fixed cut and clinch head mounted on said support housing having means to cut and clinch component leads;

(c) a movable cut and clinch head having means to cut and clinch component leads;

(d) rail means supporting said movable head on said fixed head for lateral movement of said movable head toward and away from said fixed head to accommodate cutting and clinching variable spaced component leads;

(e) a programmable drive mechanism for moving said movable head with respect to said fixed head to incrementally position said movable head a multiplicity of spacings from said fixed head;

(f) said drive mechanism including a rack carried on said movable head and a pinion engaging with said rack, said pinion being driven by a drive shaft passing through said housing in a direction normal to the lateral movement of said movable head.

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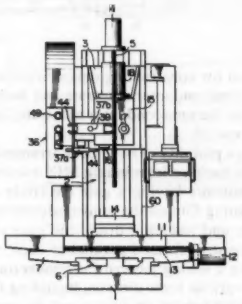
**4,516,311**

## MACHINING CENTERS

**Shilo Takakuwa; Isao Kobayashi, both of Ueda; Tastuo Takahashi, Komoro, and Shige Imamizu, Ueda, all of Japan, assignors to Kabushiki Kaisha Miyano Tekkosho, Nagano, Japan**

**Filed Dec. 30, 1982, Ser. No. 454,666**
**Claims priority, application Japan, Apr. 21, 1982, 57-66889**
**Int. Cl.³ B23Q *3/157***
**U.S. Cl. 29—568** **2 Claims**

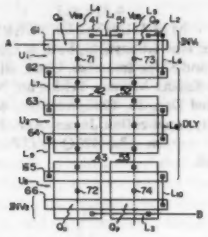


1. In a machine center of the type comprising a horizontal bed, a column disposed perpendicularly to said bed, first, second and third slide rests located to be relatively movable with respect to said bed and column, a spindle head mounted on said first slide rest to be movable vertically relative to said column, vertical and horizontal spindles provided in said spindle head for holding cutting tools, respectively, a tool exchanging mechanism and a drive mechanism attached to said spindle head for operating said spindles, a tool magazine secured to said column, and a table on which a workpiece is mounted, the improvement in which said tool magazine comprises an endless roller chain extended in a vertical plane so as to form a horizontal path and a vertical path, a number of tool pots being provided along the roller chain, said tool exchanging mechanism comprises a pair of tool exchanging arm assemblies provided respectively for said vertical and horizontal spindles so as to exchange tools held by said spindles with those stored in said tool magazine, each of said tool exchanging arm assemblies comprising a first hydraulic driving means for rotating a shaft, a second hydraulic driving means for reciprocating said shaft in its longitudinal direction, a frame member secured to an end of said shaft, a pair of arms slidably supported in an opposing parallel relationship by said frame, each of said arms having tool holding claw members pivotally mounted on an outer end thereof and a rack portion provided along an inward surface opposing the other arm, a pinion engaging with said rack portions of said arms, and a third driving means which rotates said pinion for reciprocating said two arms in opposite directions in said frame so that the tool holding claw members at the ends thereof are reciprocated between a first positional state in which cutting tools held in the spindle and stored in the magazine can be seized by the tool holding claw members, and a second positional state in which the claw members retract from the cutting tools.

## 4,516,312
## METHOD FOR CONSTRUCTING DELAY CIRCUITS IN A MASTER SLICE IC

**Masayoshi Tomita, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Feb. 10, 1982, Ser. No. 347,464**
**Claims priority, application Japan, Feb. 12, 1981, 56-19310**
**Int. Cl.³ H01L *29/78***
**U.S. Cl. 29—571** **5 Claims**



1. A method for constructing delay circuits in a master slice IC having a semiconductor substrate and having an insulating film formed on the semiconductor substrate, said method comprising the steps of:

(a) forming a plurality of basic cells arranged in parallel in an array, the basic cells including MIS transistors, each of the MIS transistors having a gate electrode formed through the insulating film on the semiconductor substrate, having a source, and having a drain, the gate electrodes of the MIS transistors formed parallel to each other;

(b) selecting a wiring pattern for connecting the basic cells to form various logic circuits, including forming an input logic circuit having an output and an output logic circuit having an input; and

(c) connecting one or more of the parallel gate electrodes of the MIS transistors in at least one of the basic cells and connecting the sources and drains of the MIS transistors to form a delay circuit between two of the logic circuits, the delay circuit comprising a resistance derived from the gate electrodes and a capacitance formed between the gate electrodes and the semiconductor substrate, comprising the substeps of:

(i) sequentially connecting the output of the input logic circuit to a first end of a first one of the gate electrodes adjacent to the input logic circuit;

(ii) connecting a second end of the first one of the gate electrodes to a first end of a second one of the gate electrodes adjacent to the first one of the gate electrodes; and

(iii) connecting a second end of a last one of the gate electrodes adjacent to the output logic circuit, to the input of the output logic circuit.

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## 4,516,313
## UNIFIED CMOS/SNOS SEMICONDUCTOR FABRICATION PROCESS

**Raymond A. Turi, Miamisburg, and Robert F. Pfeifer, Centerville, both of Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed May 27, 1983, Ser. No. 499,044**
**Int. Cl.³ H01L *21/76, 21/90***
**U.S. Cl. 29—571** **14 Claims**

1. A unified process for fabricating CMOS and SNOS type devices on a semiconductor substrate, comprising the steps of:

forming wells of first and second impurity type in a common semiconductor substrate;

forming field oxides between the wells;

forming gate oxide layers over the wells;

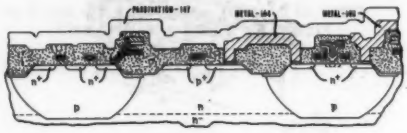
forming a first patterned conductive layer over the field oxides and gate oxide layers as gate and interconnect electrodes;

selectively doping regions in the first and second impurtiy type wells to form interconnect and S/D regions selectively self-aligned with the first patterned conductive layer and of an impurity type opposite that of the respective well;

lightly doping the substrate at the SNOS device with a impurity type opposite that of the SNOS device well;

forming a first isolation oxide layer over the first patterned conductive layer and the selectively doped regions;

selectively removing oxide from over the SNOS device to expose the semiconductor substrate;



forming a memory dielectric over the exposed semiconductor substrate;

selectively removing memory dielectric and oxide from the selectively doped regions in the first and second impurity type wells;

forming a second patterned conductive layer over the semiconductor substrate;

forming a second isolation dielectric layer over the second patterned conductive layer; and

forming conductive contacts to selectively interconnect the doped interconnect regions, the S/D regions, the first patterned conductive layer and the second patterned conductive layer.

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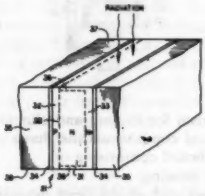
## 4,516,314
## METHOD OF MAKING A HIGH INTENSITY SOLAR CELL

**Bernard L. Sater, 9007 Westlawn Blvd., Olmsted Falls, Ohio 44138**

**Continuation of Ser. No. 539,546, Oct. 6, 1983, abandoned, which is a division of Ser. No. 327,567, Dec. 4, 1981, Pat. No. 4,409,422, which is a continuation of Ser. No. 53,923, Jul. 2, 1979, abandoned, and Ser. No. 522,244, Nov. 8, 1974, abandoned.**
**This application Mar. 16, 1984, Ser. No. 590,331**
**Int. Cl.³ H01L *31/18***
**U.S. Cl. 29—572** **11 Claims**



1. A method of manufacturing an array of integrally bonded, series connected matrix of high intensity solar cells, comprising the steps of:

(a) Forming identical PNN+ (or NPP+) junctions to a depth of approximately 0.001 inch into flat wafers of high resistivity N type (or P type) silicon of more than 100 ohm-cm with a thickness of approximately 0.008 inch with the PNN+ junctions lying in the plane of the wafers;

(b) Stacking these PNN+ wafers with approximately 0.001 inch aluminum foil interposed between each wafer and with each wafer's PNN+ junction and crystal orientation orientated in the same direction;

(c) Alloying the silicon wafers and aluminum interfaces under pressure at eutectic temperatures so that the stacked assemblage will be integrally bonded together;
(d) Preparing the end surfaces of later connection of electrical leads by metallization;
(e) Cutting the said assemblage into a plurality of slabs having a thickness of approximately 0.020 inch by cutting it along parallel planes extending perpendicular to the plane of the said wafers, then cutting to trim each slab to the desired length;
(f) Etching the cut surfaces of said slabs to remove damage and metal smeared across the junctions;
(g) Treating the exposed silicon to passivate and prepare an accumulation layer to the surfaces;
(h) Attaching electrical leads to each end of the slab; and
(i) Applying antireflection coatings.

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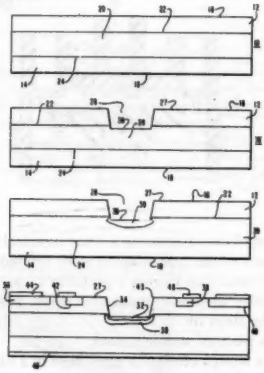
**4,516,315**

## METHOD OF MAKING A SELF-PROTECTED THYRISTOR

**John X. Przybysz, Pittsburgh, Pa., and Earl S. Schlegel, deceased, late of Columbia, Md. (by Barbara W. Schlegel, Administratrix), assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed May 9, 1983, Ser. No. 492,772**
**Int. Cl.³ H01L** *21/223, 21/265, 21/302, 29/74*
**U.S. Cl. 29—576 B** **4 Claims**



1. A process for making a thyristor, said thyristor being self-protected from overvoltage by the avalanche mechanism, comprising, forming two regions of a second type of conductivity in a body of semiconductor material of a first type of conductivity by diffusing a suitable doping material through a top and a bottom surface of said body, said two regions of second type conductivity being separated by a region of said first type conductivity, forming a well in a central portion of said top surface of said body, said well extending at least entirely through said region of second type conductivity formed by diffusion through said top surface of said body of first type conductivity, said well having a bottom surface, implanting ions, capable of forming a region of first type conductivity, through said bottom surface of said well, whereby a region of said first type of conductivity is formed adjacent to the bottom surface of said well, forming a region of said second type of conductivity between said bottom surface of said well and said region of first type conductivity formed by ion implantation, activating said implanted region, forming at least one region of said first type of conductivity in said region of second type conductivity formed by diffusion through said top surface, said at least one region being spaced apart from said well, said at least one region extending into said region of second type of conductivity to a width less than the width of the region of second type conductivity, affixing metal electrical contacts to said top surface of said body in ohmic electrical contact with said at least one region and said region of second type of conductivity, affixing a second metal electrical contact to the bottom surface of said body in ohmic electrical contact with said region of second type conductivity formed by diffusion through said bottom surface of said body.

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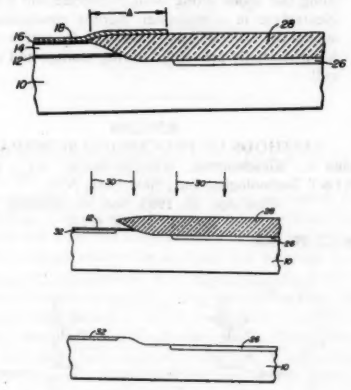
**4,516,316**

## METHOD OF MAKING IMPROVED TWIN WELLS FOR CMOS DEVICES BY CONTROLLING SPATIAL SEPARATION

**Jacob D. Haskell, Palo Alto, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.**

**Filed Mar. 27, 1984, Ser. No. 593,763**
**Int. Cl.³ H01L** *21/265, 21/22, 17/00*
**U.S. Cl. 29—576 W** **19 Claims**



1. A method for forming complementary wells of first and second conductivity types in a substrate comprising the steps of:
applying a polysilicon layer to the substrate;
doping the polysilicon layer;
applying an oxidation barrier layer over the doped polysilicon layer;
removing a portion of the doped polysilicon and the oxidation barrier layers to expose a well region of the first conductivity type in the substrate;
implanting a well of the first conductivity type in the exposed well region;
steam oxidizing the surface of the well of the first conductivity type and the polysilicon layer proximate the well of the first conductivity type beneath the oxidation barrier layer until the desired lateral oxide penetration into the polysilicon layer beneath the oxidation barrier layer has been reached to form an oxide masking layer covering and extending beyond the borders of the well of the first conductivity type;
removing the remaining oxide barrier layer to expose a well region of the second conductivity type spaced from the well region of the first conductivity type by the extended oxide masking layer;
implanting a well of the second conductivity type in the exposed well region;
removing the oxide masking layer; and
driving the wells to the desired depth, the wells remaining spaced from one another beneath the surface of the substrate to minimize compensation and migration of the well borders.

## 4,516,317
## NONAQUEOUS CELL EMPLOYING AN ANODE HAVING A BORON-CONTAINING SURFACE FILM

John C. Bailey, Columbia Station, Ohio, assignor to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 449,575, Dec. 14, 1982, Pat. No. 4,440,836.
This application Apr. 3, 1984, Ser. No. 596,446
Int. Cl.[3] H01M 6/14
U.S. Cl. 29—623.5 4 Claims

1. A method for treating an active metal anode and assembling the anode, along with a cathode and a nonaqueous electrolyte to produce a cell, which comprises

(a) preparing a boron-containing material in a liquid medium;

(b) placing an active metal anode in the boron-containing medium of step (a) for a time period sufficient to form a boron-containing film on at least a portion of the surface of the anode; and

(c) removing the anode from the liquid medium and assembling the anode along with a cathode and a nonaqueous electrolyte in a container thereby producing a cell in which the excessive passivation of the active metal anode is substantially prevented during storage and usage of the cell.

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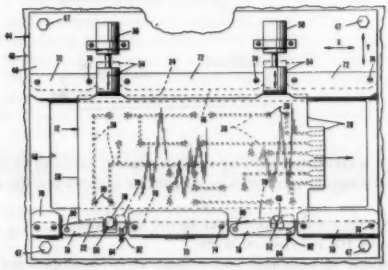
## 4,516,318
## METHODS OF PROCESSING SUBSTRATES

Duane L. Kirschenman, Winston-Salem, N.C., assignor to AT&T Technologies, Inc., New York, N.Y.

Filed Apr. 26, 1983, Ser. No. 488,856
Int. Cl.[3] H05K 3/10
U.S. Cl. 29—846 5 Claims



1. A method of precisely aligning a substrate in a preselected position in an X-Y coordinate system, wherein the substrate has first and second spaced arcuate locating recesses having the same radius formed in an edge of the substrate which is to extend in an X-direction, which comprises the steps of:

providing a first locating member which has peripherally spaced arcuate portions having a radius which is essentially the same as the radius of the arcuate locating recesses in the edge of the substrate;

providing a second locating member which has a peripheral arcuate portion having a radius which is less than the radius of the arcuate locating recesses in the edge of the substrate;

causing the first locating member to seat in the first arcuate locating recess such that the peripherally spaced arcuate portions of the first locating member engage respective portions of the substrate in the first arcuate locating recess at spaced points on respective opposite sides of a center of the arcuate recess, to locate the substrate in the X-direction, to locate an adjacent first portion of the substrate in a Y-direction which is perpendicular to the X-direction, and such that the substrate can pivot about the first locating member, and

causing the second locating member to seat in the second arcuate locating recess such that the peripheral arcuate portion of the second locating member engages the substrate in the second arcuate locating recess adjacent the center of the second arcuate locating recess with adjacent portions of the second locating member in spaced relationship to opposite sides of the second arcuate locating recess, to locate an adjacent second portion of the substrate in the Y-direction such that the edge of the substrate having the arcuate locating recesses formed therein extends in the X-direction.

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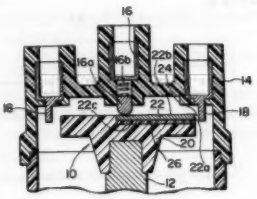
## 4,516,319
## METHOD OF MAKING RADIO FREQUENCY INTERFERENCE SUPPRESSING IGNITION DISTRIBUTOR ROTOR

Masazumi Sone, Yokohama; Iwao Imai, Yokosuka, and Hiromitsu Nagae, Katsuta, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Hitachi, Ltd., Tokyo, both of, Japan

Division of Ser. No. 286,647, Jul. 24, 1981, Pat. No. 4,425,485.
This application Oct. 17, 1983, Ser. No. 542,406
Claims priority, application Japan, Jul. 25, 1980, 55-101263; Jul. 25, 1980, 55-101264; Jul. 25, 1980, 55-101265; May 20, 1981, 56-74868; May 20, 1981, 56-74867
Int. Cl.[3] H01R 43/02
U.S. Cl. 29—877 1 Claim




1. A method of manufacturing a rotor terminal of an ignition distributor rotor of the type adapted to be rotated about its axis within a distributor cap having a plurality of output terminals circumferentially disposed about the rotor axis of rotation, comprising the steps of:

preparing a plate of stainless steel;

immersing a woven cloth of a glass fiber in a silicone varnish to form a silicone varnish-containing glass cloth constituting a silicone plate;

subjecting said silicone plate and said stainless steel plate to a hot pressing process to attach them together to form a composite plate;

setting said composite plate in a stamping machine with said silicone plate placed on a female die of the stamping machine; and

stamping the composite plate in said stamping machine by causing a male die of the stamping machine to press through an opening of the female die.

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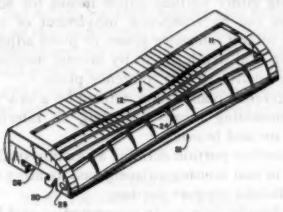
## 4,516,320
## DYNAMIC RAZOR

Anthony J. Peleckis, Fairfield, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Apr. 28, 1983, Ser. No. 489,634
Int. Cl.[3] B26B 21/06
U.S. Cl. 30—49 3 Claims

1. A razor comprising a flexible blade package having one or more blade edges supported at each end as a fixed beam, a cooperating relatively rigid guard bar, said blade package and guard bar being positioned relative to one another to provide a

given blade edge exposure, said blade package being operable in response to shaving forces to deflect relative to the guard to



alter blade edge exposure, said guard bar being formed with a rod element effective to increase its resistance to bending.

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**4,516,321**

**SAFETY RAZORS**

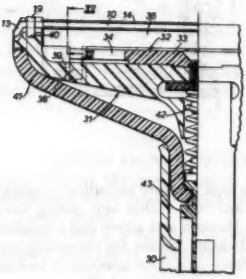
**John F. Francis, Horsell, England, assignor to The Gillette Company, Boston, Mass.**

**Filed Nov. 28, 1983, Ser. No. 555,801**

**Claims priority, application United Kingdom, Dec. 7, 1982, 8234784; Oct. 11, 1983, 8327094**

**Int. Cl.³ B26B *21/22***

**U.S. Cl. 30—50** **10 Claims**



1. A tandem blade unit for use in a safety razor, said tandem blade unit comprising: a pair of wire-supported blades, each said wire supported blade comprising a narrow elongate blade strip sharpened along one longitudinal cutting edge thereof and an elongate wire-like support formed over a length at least equal to the length of said blade strip with a substantially flat surface is directly attached, with the said cutting edge of said strip projecting forwardly of said support and with opposite end portions of said support projecting beyond the respective ends of said blade strips; and a pair of links disposed at opposite ends of said pair of wire-supported blades, each said link being moulded directly onto adjacent said end portions of said supports to form a permanent integrated assembly in wh·h said blade strips are held in spaced parallel relation.

**4,516,322**

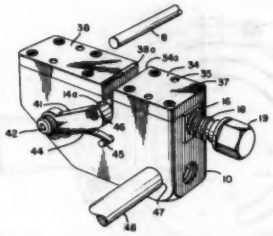
**SHEARING APPARATUS**

**Allen P. Schlein, 107 Curtis Ter., Fairfield, Conn. 06430**

**Filed Sep. 27, 1982, Ser. No. 423,729**

**Int. Cl.³ B23D *21/06***

**U.S. Cl. 30—92** **11 Claims**



1. A shear for cutting elongated elements such as bone pins and the like, said shear comprising:

an elongated rigid body member having an elongated interior cutting plug channel having first and second ends, sidewalls and a central longitudinal axis, said body member being closed except for an open slot disposed transverse to said longitudinal axis which extends from the exterior of said body member into said cutting plug channel for allowing access to said channel of an element to be sheared and except for a longitudinal slot in a first sidewall which intersects said transverse slot and which extends therefrom toward a first end of said channel in a direction parallel to said longitudinal axis;

pin carrier means slideably mounted in said cutting plug channel for longitudinal movement therealong between first and second positions, said pin carrier means having an open passageway therein which extends thereacross transverse to said longitudinal axis and is aligned with said open slot so as to be adapted to receive therein an element to be sheared when said pin carrier means is in said first position and to carry an element received therein along when said pin carrier means is moved from said first position to said second position;

cutter plug means slideably mounted in said cutting plug channel between its second end and said pin carrier means constructed and arranged to be moved into contact with with said pin carrier means and to coact with the pin carrier passageway so as to substantially encircle that portion of the length of an element supported in said pin carrier passageway which is nearest the sidewall of said cutting plug channel opposite that having said longitudinal slot and to be moved with said pin carrier means along said channel; and

means supported on said body member at the second end of said channel for applying force to said cutter plug means for moving the cutter plug means, the pin carrier means and an element carried thereby toward said first end of said channel from said first position to said second position thereby to shear the element along a shear plane defined by the mating surfaces of said cutter plug means and the sidewall of said cutting channel opposite the sidewall having said longitudinal slot, said cutter plug means and said pin carrier means coacting to restrict bending in said element as it is sheared by movement of said cutter plug means from said first position to said second position.

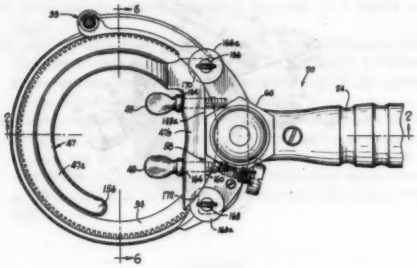
## 4,516,323
## ROTARY HAND KNIFE AND PARTS THEREFOR

**Louis A. Bettcher, Amherst, and Richard B. Decker, Vermilion, both of Ohio, assignors to Bettcher Industries, Inc., Birmingham, Ohio**

**Continuation-in-part of Ser. No. 485,738, Apr. 18, 1983, Pat. No. 4,492,027, which is a continuation-in-part of Ser. No. 318,386, Nov. 5, 1981, Pat. No. 4,439,924. This application Sep. 22, 1983, Ser. No. 534,760**

**Int. Cl.³ A22C *17/04***

**U.S. Cl. 30—276** **14 Claims**



1. In a hand knife of the type having a rotary ring blade for cutting and trimming meat, fat, and the like, comprising a handpiece having a handle portion, an arcuate portion at one end of the handle portion having a concave arcuate face and a recess in the handpiece opening through the arcuate face; a ring-like housing secured to the handpiece adjacent the arcuate portion; a ring blade supported and guided by the housing for rotation about a central axis and having ring gear teeth by which the blade is rotated; a drive pinion in the recess for driving the ring blade; and a pinion cap covering at least a major portion of the pinion and in part seated against said concave arcuate face; the improvement wherein the pinion cap has a first portion directly adjacent the blade and a second portion of greater thickness than the first and located axially farther from the blade, said second portion having an outwardly facing surface with straight-line elements extending in the axial direction of the blade and said first portion being inset therefrom.

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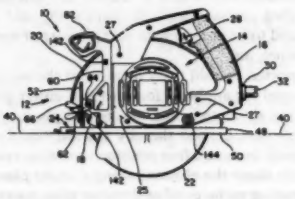
## 4,516,324
## MODULAR HOUSING SYSTEM FOR A CIRCULAR SAW

**Ammon N. Heininger, Jr., Redlion, Pa., and Edward A. Barnik, Reisterstown, Md., assignors to Black & Decker Inc., Newark, Del.**

**Filed Nov. 1, 1982, Ser. No. 438,522**

**Int. Cl.³ B23D *47/02*; B27B *9/02***

**U.S. Cl. 30—377** **6 Claims**



1. A portable circular saw, comprising:
(a) a housing;
(b) a motor mounted in said housing;
(c) a circular saw blade rotatably connected to said motor;
(d) said saw blade extending a predetermined distance from a reference plane to deliver a predetermined depth of cut;
(e) mounting means on said housing for interchangeably mounting either vertical adjust means for adjusting said depth of cut by transverse movement of said housing relative to said reference plane, or pivot adjust means for adjusting said depth of cut by pivotal movement of said housing relative to said reference plane;
(f) said reference plane being defined by a saw shoe;
(g) said mounting means including an interface portion formed on said housing;
(h) said interface portion defining a locating surface, a recess formed in said housing adjacent said locating surface, and a main handle support portion;
(i) a main handle detachably connected to said housing and engaging said main handle support portion;
(j) a cupola formed adjacent said main handle support portion and defining a main handle fastener aperture;
(k) said main handle having a hollow front portion defining a main handle orifice;
(l) said hollow front portion engaging said cupola with said main handle orifice being in registration with said main handle fastener aperture; and
(m) a fastener connecting said handle to said housing via said aperture and said orifice.

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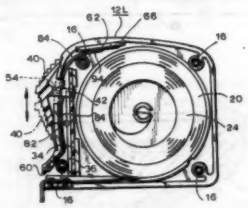
## 4,516,325
## ILLUMINATED DEVICE EMPLOYING PRINTED CIRCUIT BOARD SWITCH

**Howard Cohen, Plainview, and Edward Pakus, East Northport, both of N.Y., assignors to Irwin Measuring Tool Inc., Patchogue, N.Y.**

**Continuation-in-part of Ser. No. 457,489, Jan. 12, 1983, Pat. No. 4,462,160. This application Aug. 12, 1983, Ser. No. 522,824**

**Int. Cl.³ G01B *3/10***

**U.S. Cl. 33—138** **6 Claims**



1. In a retractable tape measure including a casing having an opening, a coiled tape rule within said casing having a face with legible indicia thereon and a free end extending through said opening in said casing, means for retracting the tape rule into the casing, locking means for selectively locking the tape rule in an extended position and releasing the tape rule for retraction into the casing, including an actuator member disposed outside said casing and movable between a unlock position in which said tape rule is released for automatic retraction and a lock position in which said tape rule is locked against retraction, an electric light device disposed in the casing for illuminating the indicia on said tape rule, a power source within said casing providing electric current to said electric light device, and a switch mechanism actuated by said actuator member and connected electrically between said power source and said electric light device, to open and close in response to movement of said actuator member to its unlock and lock positions, respectively, to cause said light to illuminate the indicia on said tape rule when said tape rule is locked in its extended position; the improvement wherein said switch mechanism includes a flexible resilient circuit board having a flexible resilient non-conducting stratum, a conductor on said stratum including a conductive pad biassed against one termi-

nal of said power source, and another conductor on said stratum having a conductive contact pad for making selective electrical contact with another terminal of said power source; means electrically coupling said electric light device to said conductors; and means yieldably biasing said flexible resilient circuit board so that said contact pad of said other conductor is normally maintained out of electrical contact with said other terminal of said power source, but said board is deflected and said contact pad is urged into electrical contact with said other terminal when said actuator member is moved to its lock position.

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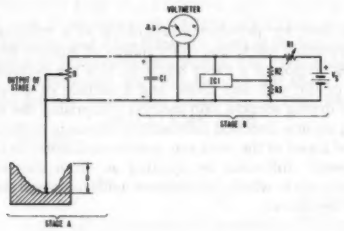
**4,516,326**

## ELECTRONIC DEPTH GAGE

**Vincent J. Calcagno, Jr., Havre de Grace, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jan. 12, 1984, Ser. No. 570,276**
**Int. Cl.³ G01B** *7/26, 7/28*
**U.S. Cl. 33—169 B** **3 Claims**



1. An electromechanical depth gage device comprising a mechanical depth micrometer mechanism with a probe; and an electrical linear resistant circuit which converts depth measurements of said probe to voltage, said circuit comprising a passive stage which responds to movements of said probe including a variable resistor, and an active stage including a Zener circuit; comprising: fixed resistors, a capacitor, a Zener regulator and a voltage source, said linear resistant circuit being operatively connected to a digital readout voltmeter for reading variation in electrical resistance of said variable resistor, as a measure of probed depth position.

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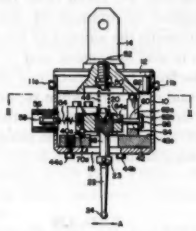
**4,516,327**

## TOUCH SIGNAL PROBE

**Yoshiro Kanda, Tochigi; Hironori Noguchi, and Tadashi Ikeda, both of Kanagawa, all of Japan, assignors to Mitutoyo Mfg. Co., Ltd., Tokyo, Japan**

**Filed May 4, 1983, Ser. No. 491,573**
**Claims priority, application Japan, May 11, 1982, 57-79678**
**Int. Cl.³ G01B** *7/02*
**U.S. Cl. 33—169 R** **3 Claims**

1. A touch signal probe comprising:
a probe case for tiltably and vertically movably holding said probe to be brought into contact with a workpiece to be measured;
a top plate affixed to the top end portion of the probe case and having a shank engageable with or disengageable from a movable bed;
a stationary plate housed in the probe case, for fixing and holding the top end portion of said probe;
a bottom receiving seat affixed to the bottom of the probe case, for holding the stationary plate;
an abutting ball and an engaging ball, which are affixed to the stationary plate and each having a side peripheral edge projecting from the stationary plate in the lateral direction and fixedly secured to the stationary plate;
a side receiving seat affixed to the probe case, for being abutted against the abutting ball to control the movement of the stationary plate in the lateral direction;
an engageable seat affixed to the probe case, having an engageable groove to be abutted thereagainst with said engaging ball at two points for controlling the position of the stationary plate in the lateral direction;
three contact point balls affixed to the stationary plate at substantially equiangular intervals, each having an under



peripheral edge projecting downwardly from the stationary plate and fixedly secured to the stationary plate;
three stationary contact points affixed to the bottom receiving seat in opposed relations to the contact point balls;
a first biasing means for urgingly biasing the stationary plate toward the bottom receiving seat; and
a second biasing means for urgingly biasing the stationary plate toward the side receiving seat and the engageable seat.

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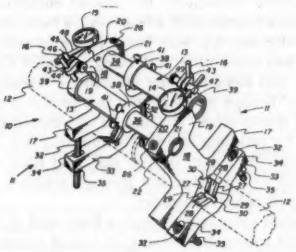
**4,516,328**

## SHAFT ALIGNMENT DEVICE

**Charles R. Massey, 3523 Southbrook, LaPorte, Tex. 77571**

**Filed Jun. 27, 1983, Ser. No. 508,268**
**Int. Cl.³ G01B** *5/25*
**U.S. Cl. 33—181 R** **10 Claims**



1. A shaft alignment device for aligning a fixed shaft and a movable shaft for coupling comprising;
a pair of substantially similar clamping members adapted to be secured one on each of said shafts,
each of said clamping members comprising a solid body having an arcuate top surface adapted to be engaged by the gauge of the other clamping member when supported on said shafts with said gauges positioned closely adjacent to each other on the same side of said shafts,
a pair of elongated gauge-supporting members supported one in each of said clamping members and extending normal thereto,
one of said gauge-supporting members extending outward from one side of one of said clamping members, and the other gauge-supporting member extending outward from the other side of the other clamping member whereby said gauge-supporting members may be positioned extending toward each other in overlapping relation when said

clamping members are positioned on said shafts for alignment thereof,

a gauge holding rod extending laterally from and carried by the end of each of said gauge-supporting members, and

a pair of dial indicator gauges mounted one on each of said rods, each having a feeler adapted to be positioned to contact the arcuate surface of the opposing clamping member adjacent to said gauge-supporting members whereby readings are taken from the surface thereof in different angular orientations of said apparatus on said shafts to determine the amount of misalignment and make adjustments in said alignment, and

said arcuate surfaces being machined on a radius whereby rotation of said members, when supported on said shafts, defines an indicating circle from the surface of which readings are taken by the dial gauge mounted on the opposing gauge holding rod.

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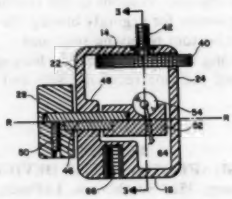
**4,516,329**

## ELECTRONIC LEVEL DEVICE

**Warren L. Dilcox, 6130 Via Casitas Ave., Carmichael, Calif. 95608**

**Filed Sep. 2, 1983, Ser. No. 528,805**
**Int. Cl.³ G01C *9/06***
**U.S. Cl. 33—366** **3 Claims**



1. An electronic level device comprising:

a substantially rectangular, box shaped enclosure having a top wall, a bottom wall, a front wall, a back wall, and two side walls; said top wall being provided with a camera mount and said bottom wall being provided with a tripod mount; said camera mount including a threaded stud extending through an elongated slot provided in said top wall, a thumb wheel attached to said threaded stud, and means for retaining said stud within said slot such that it may slide the length of said slot, said back wall being provided with another slot through which a portion of said thumb wheel protrudes;

a rotary shaft extending through a front wall of said enclosure, said rotary shaft having an axis of rotation substantially parallel to a top and a bottom wall of said enclosure;

a knob attached to an end of said rotary shaft, and wherein said enclosure is provided with indicia on said front wall proximate said knob to indicate degrees of tilt, said knob being capable of rotation of at least 180°;

an elongated mercury switch disposed within said enclosure and attached to said shaft, said mercury switch including a sealed, insulative body enclosing a quantity of mercury and two, separated conductive electrodes which can be shorted by said quantity of mercury to close said switch, said switch being closed when it is substantially parallel to said top and bottom walls of said enclosure; and

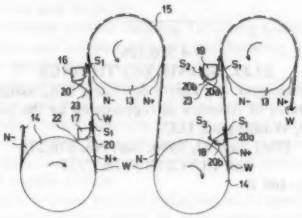
audible alarm means activated by the closure of said switch, said audible alarm means including an audible transducer having a pair of inputs, one of which is coupled to a power supply through on/off switch means, and the other of which is coupled to a grounding transistor which is forward biased when said switch is closed and reverse biased when said switch is open.

**4,516,330**

## METHOD AND APPARATUS FOR THE DRYING SECTION OF A PAPER MACHINE

**Pekka Eskelinen, and Matti Nurmio, both of Turku, Finland, assignors to Valmet Oy, Finland**

**Filed Dec. 8, 1981, Ser. No. 328,793**
**Claims priority, application Finland, Dec. 12, 1980, 803891**
**Int. Cl.³ F26B *3/04, 13/08***
**U.S. Cl. 34—23** **20 Claims**



1. A method for preventing separation of a running web from a supporting fabric due to formation of positive pressure in a drying section of a paper machine, at a nip defined by a joint run of the web and fabric and a surface of a cylinder within the drying section, said method comprising the step of

blowing air in a direction substantially opposite to the direction of travel of the joint run, and on said fabric to reduce a pressure difference by ejecting air from the positive pressure nip in which the pressure tends to detach the web from the fabric.

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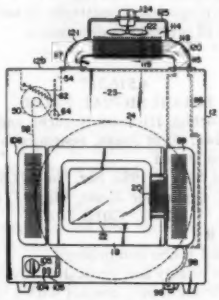
**4,516,331**

## DRYING APPARATUS HAVING RECYCLE AIR PATH

**Toshiaki Yamauchi, Aichi; Tsuneo Hibi, Gifu; Kiyomi Sasano, Ichinomiya, and Yoshiki Hayashi, Nagoya, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Jul. 19, 1982, Ser. No. 399,872**
**Claims priority, application Japan, Sep. 16, 1981, 56-146625**
**Int. Cl.³ F26B *11/04***
**U.S. Cl. 34—77** **18 Claims**



1. A drying apparatus comprising:

an outer box sealed substantially air-tightly;

a drum in which materials to be dried are housed, said drum rotatably arranged in the outer box and spaced from the inner surface of the outer box by a certain distance;

driving means for rotating the drum;

air supply means for supplying heated air into the drum to remove moisture from the materials to be dried;

moisture-removing means for cooling moist air discharged from the drum with air supplied from the outside of the outer box, to remove moisture from the discharged air;

a first path through which the moist air discharged from the drum is introduced to the moisture-removing means, said first path being defined by (a) a ventilator having one end in communication with the drum, and (b) a ventilating duct having one end in communication with the moisture-removing means, said ventilator and ventilating duct communicating with each other at the other ends thereof;

a first lint filter attached to said one end of the ventilator and positioned so as to be capable of contact with the materials in the drum whereby accumulated lint adhered to said first lint filter is effectively removed therefrom by virtue of the materials in the drum coming into contact therewith; and

a second path through which air, whose moisture has been removed by the moisture-removing means, is introduced to the air supply, said second path being defined by the inner surface of the outer box and the outer surface of the drum, wherein air discharged from the drum is again supplied into the drum through the first path, moisture-removing means, second path and air supply means.

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**4,516,332**

## APPARATUS FOR CLARIFYING AND CIRCULATING HOT AIR FOR HEAT-TREATING TEXTILE FABRICS

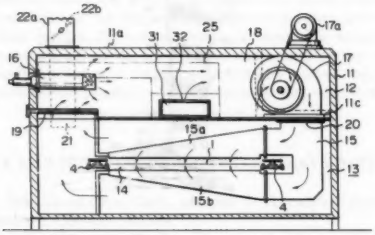
**Shozo Takaoka, and Akio Hirasako, both of Wakayama, Japan, assignors to Wakayama Iron Works, Ltd., Wakayama, Japan**

**Filed Sep. 26, 1983, Ser. No. 535,654**

**Claims priority, application Japan, Jun. 2, 1983, 58-97009**

**Int. Cl.³ F26B *21/06***

**U.S. Cl. 34—79** **4 Claims**




1. An apparatus for clarifying and circulating hot air for heat-treating textile fabrics, which comprises:

(A) a heating chamber which is divided into a plurality of compartments connected to each other which has space for allowing fabrics to pass therethrough, extending through these compartments, and which is provided with nozzle means for blowing hot air to the fabrics, and which is defined by heat-insulating walls;

(B) a hot air-circulation flue which has a hot air circulating inlet port communicated with the fabric-passing space of said heating chamber (A), a hot air circulating outlet port communicated with said hot air nozzle means, and a hot air heater and a circulation fan both arranged within said hot air-circulation flue;

(C) a hot air-exhaust duct which has exhaust air suction inlet ports communicated with said fabric-passing space, and an exhaust fan located within the hot air-exhaust duct; and

(D) at least one hot air-clarifying box which has a hot air inlet port communicated with said hot air exhaust duct (C), a hot air outlet port communicated with said hot air circulation flue (B), and hot air heater and an oxidizing catalyst layer located within the clarifying box in which apparatus:

(a) said heating chamber (A) is partitioned into a fabric treating lower chamber which contains said fabric-passing space and said hot air nozzle means, and a hot air-conditioning upper chamber located above said fabric treating lower chamber;

(b) said hot air-circulation air flue (B) extends through the compartments of said hot air-conditioning upper chamber;

(c) said exhaust air suction ports of said hot air-exhaust duct (C) are opened to the compartments of said fabric treating lower chamber;

(d) at least one hot air clarifying box is disposed in the front half portion of said hot air-conditioning upper chamber; and

(e) a hot air outlet port of said hot air-clarifying box is communicated with the hot air-circulation flue (B) via a hot air distributing duct formed in said hot air-conditioning upper chamber and hot air distributing ports provided in the hot air distributing duct.

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**4,516,333**

## DEVICE FOR CONTROLLING THE POSITION OF PRODUCT CONTAINERS CARRYING PLATES OF A LYOPHILIZATION AND THE LIKE APPARATUS

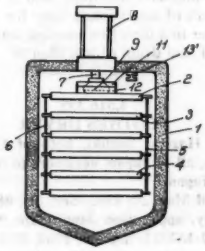
**Gianrico Rossi, Pavia, Italy, assignor to Edwards Alto Vuoto S.p.A., Milan, Italy**

**Filed May 20, 1983, Ser. No. 496,406**

**Claims priority, application Italy, May 25, 1982, 21983/82[U]**

**Int. Cl.³ F26B *25/08***

**U.S. Cl. 34—92** **3 Claims**




1. A device for controlling and tilting the Position of product containers carrying plates assembled in a plate rack structure and contained in a chamber of a lyophilization and the like apparatus, including a vertical axis pressure fluid operated cylinder-piston assembly arranged centrally at the top of said chamber, supporting links for said plate rack structure which permit adjustment of the spacing between the plates in said plate rack structure, said supporting links being vertically movable by said pressure fluid operated cylinder-piston assembly to impart vertical movement to said plates and said plate rack structure, said device comprising a swivel joint connecting the top plate of said plate rack structure to the rod of said cylinder-piston assembly so as to allow the plates of said rack structure to be tilted with respect to the horizontal plane, at least one engagement member provided laterally to said swivel joint at the top of the chamber and acting on at least the top plate of said rack structure to interlock all said plates on one side thereof to forcibly tilt them by a relative movement between said cylinder-piston rod and said engagement member.

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**4,516,334**

## ROTARY DRYER WITH ROTARY LOW-PRESSURE SYPHON

**Wilhelm Wanke, Donauschwabenstrasse 47, D-7920 Heidenheim, Fed. Rep. of Germany**

**Filed Oct. 7, 1983, Ser. No. 539,979**

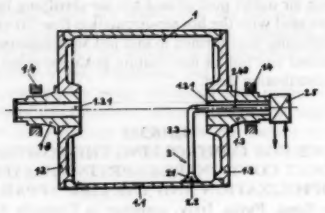
**Claims priority, application Fed. Rep. of Germany, Oct. 13, 1982, 3237994**

**Int. Cl.³ D06F *58/00*; F26B *11/02***

**U.S. Cl. 34—124** **6 Claims**

1. In a steam heated dryer drum adapted to rotate in two opposed bearing journals at its axis and provided with means

for introducing steam into the interior thereof through one of said bearing journals and further provided with syphon means rotatable with said drum for removing condensate from the interior thereof through either of said bearing journals, said syphon means comprising an outlet pipe extending through said journal bearing communicating with a standpipe provided with a syphon shoe at its end adjacent the interior surface of said drum the chamber of which receives condensate there-



from and directs said condensate from its edge toward its center along a flow path essentially parallel to said drum surface; a baffle within said syphon shoe chamber adapted to change the essentially parallel flow of said condensate so as to direct said flow into said standpipe; and at least one steam jet nozzle in the wall of said syphon shoe for introducing steam into said chamber in a direction toward said baffle at an angle to the surface of said drum of less than 90°.

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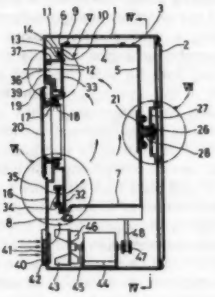
**4,516,335**
**CLOTHES DRYER**

**Yoshiaki Aoki; Hazime Suzuki, both of Otsu, and Tatsuya Hirota, Kyoto, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan**

**Filed Mar. 30, 1983, Ser. No. 480,486**
**Claims priority, application Japan, Apr. 9, 1982, 57-60156; Sep. 17, 1982, 57-162712; Sep. 20, 1982, 57-164753**
**Int. Cl.³ F26B *11/04***
**U.S. Cl. 34—133** **13 Claims**



1. A clothes dryer comprising:
a cabinet;
a horizontal type rotary drum having a peripheral wall and front and rear walls which are generally perpendicular to the peripheral wall, one of the front or rear walls having a main opening formed therein;
a stationary drum supporting disc slidably fitted in the main opening and arranged in and supported by said cabinet generally coextensively with said front or rear wall, said drum supporting disc being formed with an air inlet and an air outlet;
heater means for heating air; and
blower means for supplying air heated by the heater means into said drum through said air inlet and for discharging the air in said drum to the outside of said drum through said air outlet, said cabinet being formed with an ambient air intake opening and a discharge opening, said cabinet including a duct interposed between the discharge opening and the air outlet of the drum supporting disc, whereby after the ambient air has been sucked from said intake opening by the action of said blower means to raise the pressure in said cabinet to a higher level than the atmospheric pressure, the air in said cabinet is heated by said heater means so that the heated air is supplied to said horizontal type rotary drum.

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**4,516,336**
**PROTECTIVE OVERSHOE**

**Judith Nissenbaum, 20 Fifth Ave., New York, N.Y. 10001**

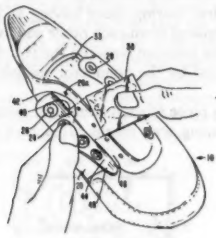
**Filed Sep. 13, 1983, Ser. No. 531,664**
**Int. Cl.³ A43B *3/16, 3/24***
**U.S. Cl. 36—7.1 R** **15 Claims**

1. A protective overshoe comprising:
a body member formed of a collapsible sheet material, said body member having a leg encasing portion and a foot encasing portion;
said foot encasing portion having an instep portion, a heel portion, a sole portion and an arch portion, said heel and sole portions being separated by said arch portion;
first reinforcement means on said heel portion and second reinforcement means on said sole portion to provide durable walking surfaces, said first and second reinforcement means being relatively non-collapsible compared to said body member and being spaced from one another by said arch portion, said first and second reinforcement means being foldable relative to each other by appropriately collapsing said arch and instep portions; and
a band member engaging and extending around said arch portion and said instep portion, said band member engaging said arch portion at a location spaced forwardly from the front edge of said first reinforcement means on said heel portion and being spaced rearwardly from the rear edge of said second reinforcement means on said sole portion, said band member providing adjustability across said arch and instep portions for various shoe sizes and shapes and for various heel heights;
whereby said overshoe will accommodate a wide variety of shoe sizes and shapes and heel heights, and whereby said overshoe may be collapsed and folded to length and width dimensions only slightly greater than the length and width dimensions of said sole portion.

## 4,516,337
## MEANS FOR DISPLAYING A PICTURE OR THE LIKE IN A SHOE

**Jaroslav Adamik, Santa Ana, Calif., assignor to San Shoe Trading Corp., New York, N.Y.**

**Filed Nov. 4, 1983, Ser. No. 548,877**
**Int. Cl.³ G09F *03/18*; A43B *23/24***
**U.S. Cl. 36—136** **15 Claims**



1. Shoe having means for providing a visual display comprising

a saddle portion having a front and a rear,

a window in said saddle portion,

a plastic element adjacent to said window,

a pocket formed along the rear of said plastic element and said window, said pocket including an entranceway accessible from the rear of said saddle portion, and

cooperating reception means carried by said saddle portion at the front and rear thereof and adjacent the entranceway of said pocket for correspondingly receiving securing means for securing the shoe on the wearer and for simultaneously closing said passageway, thereby preventing exposure of said pocket to the elements or dirt and debris.

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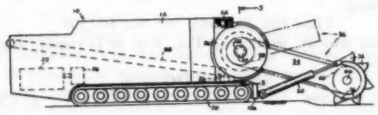
## 4,516,338
## GIMBAL MOUNTED ON FRAME WITH HEAVY METAL PLATE SIDES

**Jonas L. Roe, Santa Cruz, Calif., assignor to Terradyne Limited, Georgetown, Cayman Islands**

**Division of Ser. No. 313,155, Oct. 20, 1981, Pat. No. 4,438,575, which is a continuation of Ser. No. 93,020, Nov. 9, 1979, abandoned. This application Jan. 16, 1984, Ser. No. 570,846**
**Int. Cl.³ E02F *5/06***
**U.S. Cl. 37—4** **9 Claims**



1. Continuous excavating apparatus comprising: a longitudinally elongated, low, narrow frame including a first side-counterweight and a second side-counterweight transversely spaced therefrom, each side-counterweight being formed of a heavy metal elongated plate means of substantially greater length that its width or height; a mobile ground engaging means for said frame; a gimbal mounted on the forward end of said frame for pivotal motion about a vertical axis; a boom mounted on said gimbal for movement about a horizontal axis; said boom including an endless excavating bucket line for digging material at the movable free end of said boom to cause, while digging, a force tending to pivot the frame about a leading end of said ground engaging means; means connecting said boom to said frame at a level substantially the same as the ground engaging means for adjusting the boom and for resisting said force; said frame having an effective center of gravity and sufficient dead weight to provide a greater counter force around said leading end of said ground engaging means than the pivoting force to maintain said bucket line in an excavating position and said heavy metal plate means having a center of gravity and sufficient dead weight to provide a counter force to forces tending to rotate said frame about its longitudinal axis when performing an off center digging operation.

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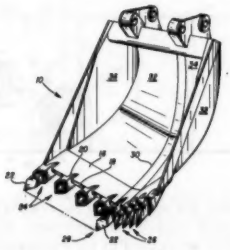
## 4,516,339
## COMBINATION EXCAVATING BUCKET, SHANK AND DIGGING TEETH

**Charles W. Hemphill, Duncanville, Tex., assignor to GH Hensley Industries, Inc., Dallas, Tex.**

**Continuation of Ser. No. 86,018, Oct. 17, 1979, abandoned. This application Jan. 19, 1984, Ser. No. 572,592**
**Int. Cl.³ E02F *9/28***
**U.S. Cl. 37—141 R** **3 Claims**



1. In an earth excavating apparatus, a bucket having a generally V-shaped lip formed along a forward end of said bucket for supporting a plurality of digging teeth for digging a ditch in the earth, at least a portion of each of said teeth projecting forwardly of said lip in the direction of digging into the earth, said each of said teeth being identical to the other teeth and being characterized by:

a tooth body formed as a quadrilateral in lateral cross-section having four sidewalls and spaced apart planar parallel faces, both of said faces terminating in opposite directions at opposed tips forming opposite terminal ends of said tooth, and both of said faces forming opposed cutting edges which diverge away from said tips, respectively, in a direction opposite to the direction of cutting so that said tooth can be reversely disposed on said bucket for cutting the earth with one or the other ends of said tooth;

support means on said lip for each of said teeth, said support means including a shank member including a shank body defining a pocket, said pocket being formed by a roof, a floor, and sidewalls for receiving said tooth in close tolerance relationship with respect to the corresponding sidewalls of said tooth body defining said quadrilateral, and said pocket being delimited by a rear wall converging to an apex so that said pocket is formed to receive on one end of a tooth with one of said faces being received in abutting relationship with said rear wall in accordance with which of said ends of said teeth are disposed in said pockets, respectively and with a tip of said tooth being received within said apex of said pocket;

means for retaining each tooth on its associated shank including a groove formed in a sidewall of said tooth and a hole formed in said shank body for receiving a retaining pin for retaining said tooth on said shank in one or the other of reversely disposed positions with an end of said tooth secured in said pocket and one or the other of said faces in abutting relationship with said rear wall so that said teeth can be located in a predetermined position in said pockets by said one or the other of said faces and interchanged between shanks even though the cutting

edges or tip formed by said faces, respectively, become worn or broken; and

said shanks are disposed on said lip to provide an array of teeth with a central tooth having its cutting face facing upwardly and slanting upwardly toward said bucket when said bucket is oriented to dig a ditch in the earth having a generally horizontal open side, and opposed sets of teeth on opposite sides of said central tooth arranged so as to have their cutting faces aligned to slope upwardly toward said bucket and inwardly toward said central tooth.

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**4,516,340**

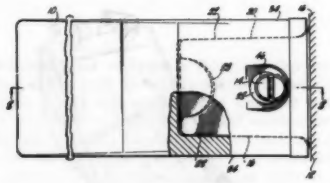
## ATTACHMENT ASSEMBLY FOR EXCAVATION TEETH

**Richard L. Launder, 8107 San Lucas Dr., Whittier, Calif. 90605**

**Filed Jun. 6, 1983, Ser. No. 501,520**

**Int. Cl.³ E02F *9/28***

**U.S. Cl. 37—142 A** **1 Claim**



1. An assembly for securing an excavation tooth in a row of teeth on an earth excavation implement comprising: a nose piece adapted to be secured to the excavation implement and defining a base portion, a forwardly extending tapered portion, said tapered portion having parallel lateral side walls and converging upper and lower surfaces, said side walls and said surfaces terminating in a forward end, a channel extending vertically through said tapered portion, a pair of substantially semi-circular recessed areas disposed in said upper and lower surfaces adjacent said forward end, said areas defining a pair of substantially parallel stablizing surfaces and curvilinear wall surfaces, said wall surfaces being perpendicarly disposed with respect to said stablizing surfaces and extending between said stablizing surfaces and said converging upper and lower surfaces and terminating at said forward end, the diameter of said recessed areas being less than the spacing between said lateral side walls; and excavation tooth having a hollow portion adapted to be snugly slidable onto said tapered portion of said nose piece and including a pair of protuberances extending into said hollow portion, said protuberances defining abutment surfaces adapted to abut in a mating relationship with said stablizing surfaces on said nose piece and perimeter wall portions extending about portions of said abutment surfaces and adapted to abut in a mating relationship said wall surfaces on said nose piece and a channel extending vertically through said tooth and communicating with said hollow portion thereof; and pin means adapted to extend through said channels in said nose piece and said excavation tooth for holding said tooth on said nose piece.

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**4,516,341**

## PICTURE FRAME ASSEMBLY

**Robert D. Jenkins, Indianapolis, Ind., assignor to David G. Reilich and Jeffrey J. Quinn, both of Indianapolis, Ind., part interest to each**

**Continuation-in-part of Ser. No. 340,257, Jan. 18, 1982, Pat. No. 4,403,434. This application Apr. 28, 1983, Ser. No. 489,239**

**The portion of the term of this patent subsequent to Sep. 13, 2000, has been disclaimed.**

**Int. Cl.³ G09F *1/12***

**U.S. Cl. 40—152** **18 Claims**

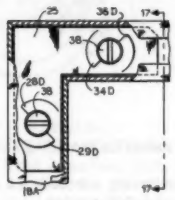
1. A frame assembly comprising:

a plurality of framing members arranged in series, with the ends of each member meeting ends of the next adjacent members in the series at junctions, to form a frame, each of said members having a generally C-shaped cross section comprising spaced facing wall means;

a plurality of connector assemblies, one of said connector assemblies being located at each of said junctions of frame members to connect the adjacent frame members together at the junction,

each connector assembly including first and second bearing pieces, said first bearing piece having at least two apertures therein spaced from each other and located on opposite sides of the junction between the two frame members being connected by the connector assembly at the junction,

said first bearing piece of each connector assembly engaging one of said facing wall means of each of the two frame




members on opposite sides of the junction and adjacent said apertures, and

said second bearing piece engaging another of said facing wall means of each of the said two frame members, and

each connector assembly including at least two bearing pad means, each bearing pad means including a bearing pad portion engaging said second bearing piece of the connector assembly,

each bearing pad means including a locating stem received in one of said apertures of the first bearing piece, the stem having a tool receiver therein;

said bearing pieces and bearing pad means having cooperating cam and follower means thereon operable by a tool when received in the tool receiver in the stem of the bearing pad means to tighten and loosen the connector assemblies between the facing wall means at the junctions.

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**4,516,342**

## ARRANGEMENT FOR EXCHANGEABLY FRAMING PICTURES

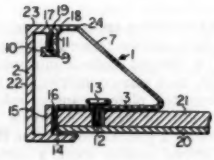
**Paul Reim, Rathausgasse 5, D-7100 Heilbronn, Fed. Rep. of Germany**

**Filed Jun. 23, 1983, Ser. No. 507,126**

**Claims priority, application Fed. Rep. of Germany, Jun. 23, 1982, 3223416**

**Int. Cl.³ A47G *1/06***

**U.S. Cl. 40—156** **21 Claims**




1. An arrangement for exchangeably framing pictures, comprising: a frame having a profiled cross section and a hook-shaped end portion and arranged to hold a cover plate and a rearward plate confining a picture therebetween; and a resilient locking member including one portion arranged to rest against the rearward plate and another portion provided with

a hook-shaped end which defines a groove and has a support face, the hook-shaped end portion of the frame being engageable in the groove of the locking member in such a manner that the support face of the hook-shaped end of the locking member abuts against the hook-shaped end portion of the frame, the frame having a profile upper part and an external profile surface the one end of which is integrally connected with the hook-shaped end portion and the other end of which is entegrally connected with the profile upper part extending perpendicularly to the external surface so that the frame is of essentially C-shaped cross section, the hook-shaped end portion having one part extending perpendicularly to the external surface and parallel to the profile upper part and another part extending perpendicularly in inward direction from the one part so as to be parallel to the external surface, said another part being wedge shaped to form a wedge bar which is engageable with the groove.

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**4,516,343**

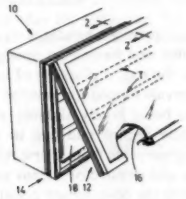
**SIGN STRUCTURE**

**Johann Stilling, Apt. #A1001, 1141 Royal York Rd., Islington, Ontario, Canada**

**Filed Jan. 18, 1983, Ser. No. 458,771**

**Int. Cl.³ G09F *13/04***

**U.S. Cl. 40—574** **6 Claims**



1. An intermediate frame construction for use in association with a sign box of the type having a box hinge recess around its perimeter and a front frame for supporting a face panel, said front frame having a front hinge, said intermediate frame comprising;

a generally rectangular frame having two end members, and top and bottom members, joining one another at corners, each of said members having an outer wall;

face panel supporting means connected with said outer wall and extending inwardly, for supporting a face panel therein;

an intermediate hinge connected to said outer wall, and extending in a rearward direction for hinging interengagement with said box hinge recess in said sign box, and,

wall means defining an intermediate hinge recess connected to said outer wall, and extending in a forward direction, and adapted to receive said front hinge carried on said front frame whereby such front frame is hingedly connected to such intermediate frame, and such intermediate frame is in turn hingedly connected to such sign box.

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**4,516,344**

**PORTABLE WIND-RESISTANT SIGN STAND WITH FLEXIBLE SIGN**

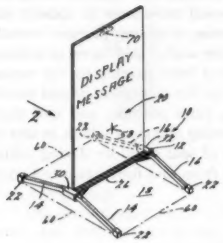
**James R. Seely, Rochester, Mich., assignor to Marketing Displays, Inc., Farmington Hills, Mich.**

**Filed Dec. 30, 1983, Ser. No. 567,379**

**Int. Cl.³ G09F *7/00***

**U.S. Cl. 40—602** **27 Claims**

1. A lightweight and readily portable sign and stand apparatus, comprising an elongated base assembly, a plurality of ground-engaging legs extending transversely from and secured to said elongated base assembly, a one-piece monolithic sign panel having a lower peripheral portion and protruding in a generally vertical direction from said elongated base assembly and having at least one generally planar display surface thereon, said base assembly including clamping means for clampingly securing and anchoring substantially the entire length of the lower peripheral portion of said sign panel to said elongated base assembly in a generally fixed relationship therewith, said sign panel being sufficiently rigid to be self-supporting in said generally vertically protruding relationship with said base assembly but sufficiently flexible and resilient to bendably deflect without yielding in response to predetermined loads exerted thereon in directions transverse to the plane of said display surface, said sign and stand apparatus having a combined center of gravity located a predetermined vertical distance above the ground, said legs being configured to engage the ground at a predetermined horizontal distance




from said base assembly, said combined center of gravity remaining horizontally within the confines of the area defined by the locations at which said legs engage the ground during said bendable deflection of said sign panel in order to substantially prevent said sign and stand apparatus from tipping over in response to said predetermined transverse loads, said sign panel, when deflected, having a continuously curved portion defining an airfoil, said sign panel having the lower peripheral portion disposed a preselected height above the ground to define an open area generally beneath said sign panel, the size of said open area in relation to the size of said sign panel and the shape of said airfoil cooperating to substantially negate aerodynamic lift.

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**4,516,345**

**CARTRIDGE EJECTOR DEVICE FOR FIREARMS**

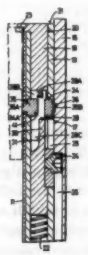
**Rune Flodman, Nora, Sweden, assignor to Flodman Guns KB, Nora, Sweden**

**PCT No. PCT/SE81/00285, § 371 Date Jun. 1, 1983, § 102(e) Date Jun. 1, 1983, PCT Pub. No. WO83/01297, PCT Pub. Date Apr. 14, 1983**

**PCT Filed Oct. 2, 1981, Ser. No. 503,137**

**Int. Cl.³ F41C *15/00***

**U.S. Cl. 42—46** **6 Claims**



1. In a firearm having a barrel secured to a breech and a receiver interconnected by a hinge for enabling relative pivotal movement to open the action thereof, and means for ejecting a

cartridge in response to such opening pivotal movement, said means comprising:

(a) a cartridge ejector slideably mounted in said breech for movement paralllel to said barrel between a fully advanced position and a retracted position, and biased by a spring toward said retracted position, said ejector having a shoulder extending transversely to the direction of ejector movement; and

(b) A combined latch and sensing member slideably mounted in a bore in said breach for movement transverse to that of said ejector between a non-latching inner position and a latching outer position, said member having a portion for latching said ejector adjacent to its said fully advanced position, said member being responsive to said opening pivotal movement to unlatch said ejector, said member having a sensing plunger extending through an opening in the wall of said barrel an actuatable in response to mechanical force exerted by the expanding shell of a fired cartridge for movement of said member to said ejector-latching outer position, and said member having an ejector-arresting abutment which, in said outer position, is in the path of said shoulder during initial movement of said ejector from said fully advanced position.

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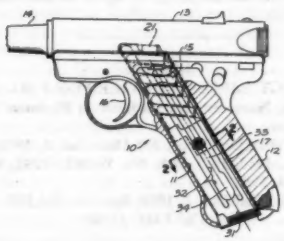
**4,516,346**

## MAGAZINE FOR GUNS

**Frank W. Farrar, Los Alamitos, and Carl J. Cupp, Hawaiian Gardens, both of Calif., assignors to Pachmayer Gun Works, Inc., Los Angeles, Calif.**

**Filed Feb. 1, 1983, Ser. No. 462,920**
**Int. Cl.³ F41C *25/02***
**U.S. Cl. 42—50** **16 Claims**



1. A magazine comprising:

a magazine body to be inserted into a gun and adapted to contain a series of rounds of ammunition;

a follower movable upwardly and downwardly within said magazine body beneath said rounds to urge them upwardly;

a spring yieldingly urging said follower upwardly; and

a holding structure mounted to said follower for movement upwardly and downwardly therewith and for rotary movement relative to the follower about an axis between an active position in which said structure retains the follower against movement upwardly from a lower setting thereof and a released position permitting such upward movement;

said holding structure being also mounted for movement axially along said axis relative to said follower and operable by said axial movement to releasably latch the follower against upward movement.

**4,516,347**

## FISHING NET

**Harold G. Dickie, Stewiacke, Canada, assignor to Dickie Investments Incorporated, Colchester, Canada**

**Filed Dec. 9, 1983, Ser. No. 559,694**
**Claims priority, application Canada, Sep. 15, 1983, 436801**
**Int. Cl.³ A01K *77/00***
**U.S. Cl. 43—11** **10 Claims**

1. A net structure comprising a handle, a rigid hoop secured to said handle, a flexible bag having an openable top portion defining the mouth of the bag, a plurality of connector means secured at spaced intervals to said top portion of the bag, said connector means also being freely slidably attached to said rigid hoop to pendantly secure said bag to said hoop, said connector means being movable from a first relative positional arrangement wherein said connector means are spaced apart about said hoop to define the open mouth position of the bag to a second relative positional arrangement wherein said connector means are grouped together on said hoop to define the closed mouth position of the bag, and an elastic member connected between selected ones of said connector means such that as said connector means are made to slide along said hoop between said first and second relative positional arrangements, the distance between said selected ones of said connector means varies such that said elastic member is first made to increase in length and then allowed to decrease in length and at least partially relax whereby to assist in resiliently retaining said bag in both the open mouth and closed mouth positions thereof.

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**4,516,348**

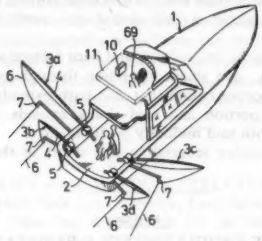
## TRAWLING LINE INFORMATION COMMUNICATION SYSTEM

**Haruomi Hirose, Tokyo, and Akio Yamazaki, Saitama, both of Japan, assignors to Daiwa Seiko Co., Ltd., Tokyo, Japan**

**Filed Aug. 12, 1983, Ser. No. 522,855**
**Claims priority, application Japan, Aug. 18, 1982, 57-143098**
**Int. Cl.³ A01K *97/12***
**U.S. Cl. 43—17** **1 Claim**

1. A trawling line information communication system comprising a fishing device mounted on the deck of a trawling vessel, a sensor for detecting the delivery winding speed of the line of said fishing device, a sensor for detecting tension applied to said line, a transmitter for transmitting line information detected by each of said sensors, a receiver mounted on the operator side of the trawling vessel for receiving and demodulating a transmitted signal from said transmitter, an indication part controlled by a demodulated signal from said receiver for indicating the length of the delivery and winding of said fishing line, a means for informing a vessel operator of the delivery and winding speed of the fishing line, a line tension indicating

part controlled by the demodulated signal from said receiver for bar-indicating the tension of the fishing line, and a timer



means starting to operate when a fish is caught by said fishing device.

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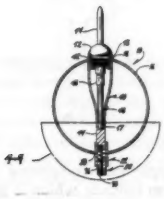
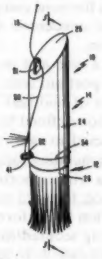
**4,516,349**
**FISHING BOBBER**
**Howard W. Klocksiem, Box 18, Paton, Iowa**
**Filed May 16, 1983, Ser. No. 494,800**
**Int. Cl.³ A01K** *93/00*
**U.S. Cl. 43—17.5** **8 Claims**



1. A fishing bobber, comprising:
a spherically shaped hollow float member having a center axis and upper and lower apertures at the respective ends of said axis,
a first tube element rigidly secured to said float member in said lower aperture and having an upper end within said float member and a lower end extending outside said float member,
said first tube element having a longitudinal axis co-extensive with the center axis of said float member,
a second tube element having an upper end rigidly secured to the float member at its upper aperture, and a lower end supported by said first tube element so that said second tube element is positioned primarily within said float member,
said second tube element having a longitudinal axis co-extensive with the center axis of said float member,
a cap element detachably secured to the upper end of said second tube element and dwelling outside and above said float member,
a light element in said cap element,
a battery means in said second tube element and adapted to be in operative contact with said light element to cause said light element to be illuminated at times,
and a fish line connection means on the lower end of said first tube element, said fish line connection means comprising a hook having a generally J-shaped end protruding downwardly from said lower tube, a line retainer within said lower tube and vertically movable relative to said hook and spring means operative to urge said retainer downwardly toward said J-shaped end portion to grip a fish line extending therethrough.

**4,516,350**
**FISHING LURE**
**Manley L. Malphrus, 2130 Brooks Dr., #809, Forestville, Md. 20747**
**Filed Jul. 18, 1983, Ser. No. 514,794**
**Int. Cl.³ A01K** *85/01*
**U.S. Cl. 43—17.6** **12 Claims**



1. A fishing lure, comprising:
(a) a pair of first and second tubes, each having a generally cylindrical side wall enclosed at one end by an end wall and open at an opposite end, said cylindrical side walls having diameters enabling the second tube to be coaxially inserted into the first tube said end wall first with overlapping portions of the side walls in sealing, slip fitting contact with each other to define a watertight compartment in a forward interior portion of the first tube between said end walls, said tubes when connected together forming a lure body; and
(b) means for enabling a hook to be affixed to at least one of said first and second tubes.

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**4,516,351**
**CASTING ROD AND HANDLE ASSEMBLY**
**Dennis N. Highby, Sidney, Nebr., assignor to Cabela's Inc., Sidney, Nebr.**
**Filed Dec. 6, 1982, Ser. No. 446,966**
**Int. Cl.³ A01K** *87/00, 87/06*
**U.S. Cl. 43—23** **2 Claims**

1. A pistol grip type casting rod handle assembly in combination with a casting-type rod blank having reduced weight, improved sensitivity and improved balance comprising:
a handle body having a throughbore defined by interior surfaces extending through substantially a full circle and a unitary rod blank of the casting type extending through said throughbore in direct contact with and connected to said interior surfaces to reinforce and strengthen said handle body and improve sensitivity, said rod blank being continuous and unbroken in its extension through the handle body extending beyond the rear end of said handle body,
said handle body having a recessed surface along a line disposed inwardly of the periphery of said rod blank defining a reel seat on which a reel base is supported to bring the reel base in close proximity to the axis of the rod blank for providing improved reel balance on the rod,
said reel seat having a top opening provided by having said throughbore extend into said reel seat and a first exposed rod blank portion in said top opening that projects above said reel seat for contacting the base of the reel whereby

to receive rod blank vibrations that are transmitted through said rod blank to a reel carried by said reel seat and into the hand of the user,

said handle body having a bottom opening and a second exposed rod blank portion in said bottom opening projecting out of said bottom opening whereby to receive rod blank vibrations that are transmitted through said rod blank directly to the finger of the user,

said body having a forward end portion with a forward bore section arranged concentric with the center of said forward end portion,

said body having a rear end portion upwardly offset from said front end portion with a rear bore section offset below the center of said rear end portion,

said rear bore section defined by interior surfaces in contact with and connected to said rod blank with said rear end portion fully surrounding said rod blank at said rear end,

said body having a trigger portion,

said recessed surface, forward end portion, rear end portion, and trigger portion being formed as a one-piece member, said member being secured to said rod blank for transmitting rod blank vibrations to said reel seat; and

an offset hand grip extending rearwardly of said handle body and extending downwardly at an angle to said rod blank, said grip having a grip bore alined with said throughbore and extending from a front end of said grip to the rear of said grip, said grip fully covering said rod blank, said rod blank being secured to said grip to provide an offset pistol grip type assembly for proper grip angle and casting comfort.

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**4,516,352**

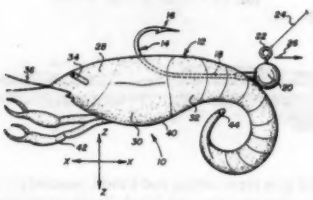
## ARTIFICIAL CRAWFISH LURE WITH DORSAL AND VENTRAL SEAM

**Herman P. Firmin, Baton Rouge, La., assignor to Knight Manufacturing Company, Inc., Tyler, Tex.**

**Continuation-in-part of Ser. No. 400,296, Jul. 21, 1982,. This application May 2, 1983, Ser. No. 490,499**

**Int. Cl.³ A01K *85/00***

**U.S. Cl. 43—42.26** **1 Claim**



1. An artificial lure comprising:

an elongated body of elastomeric material having integral head, midbody and cantilevered tail portions said midbody portion extending rearwardly of said head portion and said cantilevered tail portion extending in a spiral manner downwardly, then inwardly and then rearwardly of said midbody portion and continuously tapered therefrom to form an increasingly tapered arch of approximately 360° from a longitudinal plane of said midbody portion;

a ventral fabrication seam formed on the ventral side of said head, midbody and tail portions;

a dorsal seam formed on the dorsal side of said head, midbody and tail portions;

said tail portion having a substantially circular cross-section terminating in a relatively flat fin disposed substantially perpendicular to said midbody portion with the extreme tip of said fin extending in the rearward direction such that said fin oscillates in response to water flowing around said tail portion as said lure is drawn backwards through the water;

a pair of paws extending downwardly of said midbody portion and outwardly toward said head portion an aligned in the same plane as said dorsal and ventral fabricating seams;

a hook means having a shank and barb formed at one end of said shank, said shank extending through said midbody and tail portions such that said barb extends above said midbody portion and said shank extends substantially parallel with said midbody portion; and

a weight member secured to said shank at the other end thereof.

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**4,516,353**

## METHOD OF PRODUCING VOLE-RESISTANT APPLE TREES AND TREES PRODUCED THEREBY

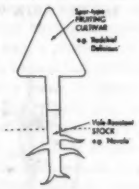
**James N. Cummins; Herb S. Aldwinckle, both of Geneva, N.Y., and Ross E. Byers, Winchester, Va., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Jun. 24, 1982, Ser. No. 391,770**

**The portion of the term of this patent subsequent to Nov. 13, 2001, has been disclaimed.**

**Int. Cl.³ A01H *1/00***

**U.S. Cl. 47—58** **7 Claims**




1. A composite apple tree comprising a fruiting cultivar grafted to an interstem cultivar which is in turn grafted to a 'Novole' rootstock.

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**4,516,354**

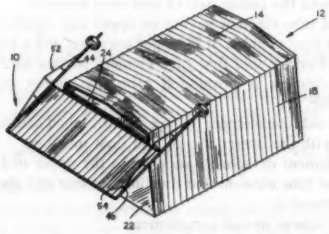
## COUNTERWEIGHT DOOR STRUCTURE

**J. Joseph Dugan, Box 127, Greeley, Nebr.**

**Filed Nov. 16, 1983, Ser. No. 552,250**

**Int. Cl.³ E05F *1/00***

**U.S. Cl. 49—387** **9 Claims**



1. A counterweight door structure, comprising,

a door having a top edge, bottom edge and opposite side edges,

at least one arm connected to said door and extended upwardly therefrom,

a counterweight carried on said arm at a position in spaced relation from said door,

door mounting means on said door for supporting said door for pivotal movement about a horizontal axis positioned closely adjacent the top edge of the door, and

a forwardly extended truss on said arm and said door, said truss spanning a substantial portion of the height of the door and arm,

said truss comprising an elongated tension member having upper and lower ends, means for securing said upper end of the tension member to said arm, means for securing said lower end of the tension member to said door and a plurality of spacer links arranged in spaced-apart relation along said arm and door and connected to said tension member.

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**4,516,355**

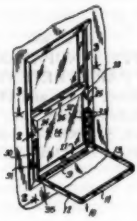
**LIFT RAIL WINDOW STRUCTURE**

**Dan Basil, 1428 Park Ave., Merrick, Long Island, N.Y. 11566**

**Filed Jan. 4, 1984, Ser. No. 567,966**

**Int. Cl.³ E05B *1/00***

**U.S. Cl. 49—460** **5 Claims**



1. In a window assembly having an outer frame defining an inner opening having parallel vertical edge surfaces, at least one window sash having vertical side jamb rails; a top rail extending between said jamb rails and a bottom rail extending between said jamb rails, said sash being mounted in said outer frame for sliding movement between a lower window-closed position and an upper window-open position; an improved window opening structure including:

(a) a pair of elongated, lift guide means having an L-shaped cross section, each lift guide means having a mounting leg and a guide leg connected thereto;

(b) a lift arm means projecting outwardly from each of said lift guide means;

(c) lift rail means extending horizontally between said lift arm means;

(d) fastening means securing each of said mounting legs respectively to said vertical jamb rails; and

(e) joining means permanently connecting said lift arms to said guide legs;

(f) said guide legs having outer guide surfaces disposed parallel with and adjacent to the inner vertical opening surfaces of said window frame opening.

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**4,516,356**

**INSULATED PLASTIC FRAME FOR DOORS, WINDOWS AND THE LIKE**

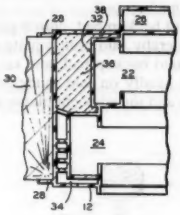
**Ralph Delman, 2914 Hardale, Toledo, Ohio 43606**

**Filed Dec. 14, 1983, Ser. No. 561,304**

**Int. Cl.³ E06B *1/04***

**U.S. Cl. 49—504** **11 Claims**

1. An insulated frame for doors, windows and the like comprising, in combination, a plurality of elongate frame sections each having notched corners and joined to an adjacent said frame section at a right angle, each of said elongate frame sections defining a plastic extrusion having at least one internal passageway extending along its length, said passageway having a plurality of surfaces, at least a pair of said sections defining at least one channel for receiving an associated movable panel, insulating means disposed in said passageway for reducing heat transfer therethrough and means for positioning said insulation away from at least one of said surfaces and defining



an air filled region between said one of said surfaces and said insulation.

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**4,516,357**

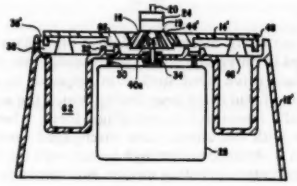
**COOLANT SUPPLY APPARATUS FOR A GRINDING TOOL**

**Paul Gach, 1224 Woodbridge, St. Clair Shores, Mich. 48080**

**Filed Feb. 15, 1983, Ser. No. 466,437**

**Int. Cl.³ B24B *9/10***

**U.S. Cl. 51—98 R** **21 Claims**



1. A grinding apparatus comprising:

a housing having a coolant reservoir for retaining a liquid coolant;

drive means supported in the housing having a drive shaft that protrudes into the coolant reservoir;

a grinding tool attached to the drive shaft;

a work table supported on the housing above the coolant reservoir, the work table having an opening through which the grinding tool protrudes;

an impeller attached to the drive shaft, at least a portion of the impeller being situated in the coolant reservoir for impelling coolant upwards from the reservoir when the drive shaft is rotating; and

collar means extending downwardly from the work table into the coolant in the coolant reservoir and surrounding at least a portion of the impeller and the portion of the grinding tool that extends below the work table, thereby serving to direct the coolant from the impeller towards the grinding tool.

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**4,516,358**

**CLUTCH ASSEMBLY FOR SANDING HEAD**

**Miksa Marton, 3620 Randin Blvd., and George Marton, 1835 Todd Ln., both of Windsor, Ontario, Canada**

**Filed Feb. 2, 1984, Ser. No. 576,306**

**Claims priority, application Canada, Apr. 29, 1983, 427102**

**Int. Cl.³ B24B *23/02***

**U.S. Cl. 51—119** **5 Claims**

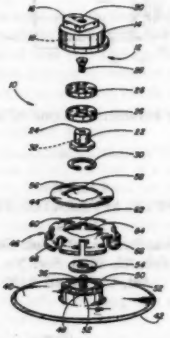
1. A clutch assembly for a sanding head to provide said head with dual functions of random orbital sanding and rotary grinding, said assembly comprising;

(a) a drive head including an eccentrically located drive spindle mounted for rotation in and with respect to said head, the latter having a planar bottom surface;

(b) a backup pad having a centrally located stud secured in said drive spindle; and

(c) a clutch plate and clutch actuating means mounted concentrically on said backup pad;

(d) guide means on said backup pad, clutch plate and clutch actuating means whereby said clutch plate and actuating means rotate with said backup pad, and said clutch plate being free to move axially on said guide means between the actuating means and the adjacent planar surface of said drive head;



(e) said actuating means including a plurality of segments adapted to move said clutch plate axially into engagement with said drive head surface in response to high speed rotation of said drive head during which the segments use upwardly responsive to centrifugal force, whereby at low speeds with the clutch plate disengaged random orbital motion is obtained and at high speeds with the clutch plate engaged rotary grinding motion is obtained.

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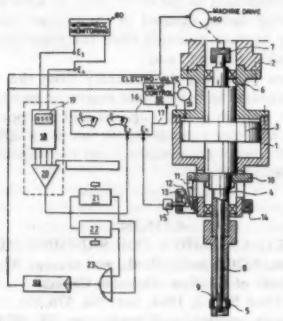
**4,516,359**

## GRINDING MACHINE

**Pierre A. Largeteau, Bezons, France, assignor to S.A. Automobiles Citroen and Societe Automobiles Peugeot, both of Paris, France**

**Filed Apr. 9, 1982, Ser. No. 367,065**
**Claims priority, application France, Apr. 16, 1981, 81 08064**
**Int. Cl.³ B24B *5/36***
**U.S. Cl. 51—349** **7 Claims**



1. A grinding machine comprising:

an expandable grinding tool connected to a machine drive;

an expansion rod received in said tool and axially displaceable therein to expand said tool;

a fluid operated jack having a piston connected to said rod for axially displacing same;

means for continuously monitoring position of said piston for continuously generating an electrical signal as a function of this position and of expansion of said tool;

an analog voltmeter receiving said signal and having a variable threshold for outputting a control signal upon attainment of said threshold;

an electrovalve emergized by said control signal and connected to said jack for operating same to modify the expansion of said tool automatically to compensate for wear thereof; and

means for automatically modifying said threshold upon wear of said tool and a change in dimensions of a product ground by the tool.

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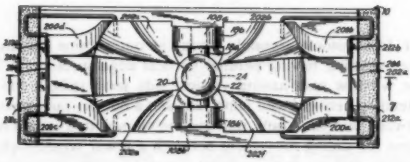
**4,516,360**

## MOLDED POLE-TYPE SANDPAPERING TOOL HAVING RESILIENT PAPER RETENTION MEANS

**Donald Gringer, Bedford, N.Y., and Howard Soled, Teaneck, N.J., assignors to Allway Tools, Inc., Bronx, N.Y.**

**Filed Feb. 3, 1983, Ser. No. 463,513**
**Int. Cl.³ B24D *15/00***
**U.S. Cl. 51—384** **6 Claims**



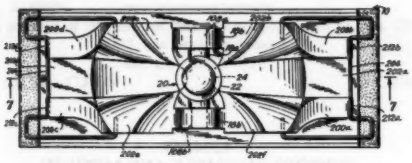
1. A molded pole-type sandpapering tool comprising a molded body member, said molded body member comprising a planar flat backing surface capable of being covered with sandpaper for providing an abrasive surface, and a handle mounting surface disposed on the opposite side of said sandpaper backing surface; and a molded universal joint mounted substantially at the center of said handle mounting surface and being connectable to an elongated handle member for permitting said body member abrasive surface to be disposed in a plurality of angular positions with respect to said handle for enabling optimum positive pressure to be applied to said abrasive surface through said handle member, said universal joint comprising a molded resilient male clevis resiliently engagable in a molded female clevis extending from said handle mounting surface for providing a two piece resilient universal joint having a positive friction fit, said tool further comprising a resilient wire-like unitary spring clip disposed on said handle mounting surface adjacent the ends thereof for removably securing said sandpaper on said backing surface, said spring clip having a locking portion and a pressure engaging portion, said sandpaper extending across said backing surface and around said ends onto said handle mounting surface for enabling positive pressure engagement thereof by said spring clip pressure engaging portion, said handle mounting surface comprising two pairs of spaced apart contoured guide ramps, with said pairs being disposed on opposite sides of said universal joint in the same plane, said spring clip being pivotally mounted to said guide ramp, said guide ramp further comprising a retention notch therein for removably locking said resilient wire spring clip locking portion in a sandpaper securing position against said handle mounting surface for maintaining positive pressure of said spring clip pressure engaging portion against said handle mounting surface.

4,516,361

## MOLDED POLE-TYPE SANDPAPERING TOOL

Donald Gringer, Bedford, N.Y., assignor to Allway Tools, Inc., Bronx, N.Y.

Filed Feb. 3, 1983, Ser. No. 463,518
Int. Cl.[3] B24D 15/00
U.S. Cl. 51—392 14 Claims



1. A molded pole-type sandpapering tool comprising a molded body member said molded body member comprising a planar flat backing surface capable of being covered with sandpaper for providing an abrasive surface, and a handle mounting surface disposed on the opposite side of said sandpaper backing surface; and a molded universal joint mounted substantially at the center of said handle mounting surface and being connectable to an elongated handle member for permitting said body member abrasive surface to be disposed in a plurality of universal angular positions with respect to said handle for enabling positive pressure to be applied to said abrasive surface through said handle member, said handle mounting surface comprising a pair of spaced apart peripherally disposed molded sloped contoured guide ramps adjacent said universal joint for enabling said universally mounted handle member to be guided into substantially orthogonally disposed planar positions substantially parallel to said abrasive surface for enabling said optimum positive pressure to be applied thereto while permitting said handle member to be further guided into a plurality of other angular positions from said orthogonal positions during a universal movement of said handle member, the spacing between said pair of spaced apart sloped contoured guide ramps defining a pair of substantially orthonogal positions for said planar positioning of said handle member and comprising sloped contoured surfaces positively guiding said handle member on a universal contoured path between said orthogonal positions and said plurality of other angular positions during said universal movement of said handle member, said sloped contoured surfaces substantially defining a 360 degree path of guided movement for said handle member; whereby said handle member may be freely guided into said plurality of universal angular positions without being lockably retained therein.

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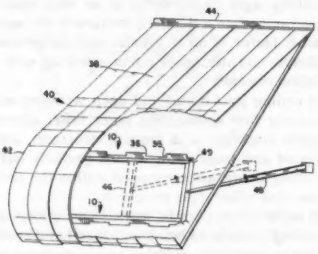
4,516,362

## AWNING STRINGER

Lloyd E. Carden, St. Petersburg, Fla., assignor to Aluminum Metals, Inc., St. Petersburg, Fla.

Filed May 23, 1983, Ser. No. 496,976
Int. Cl.[3] E04F 10/08
U.S. Cl. 52—75 4 Claims

1. An awning stringer, comprising, in combination,
a first rigid, elongate beam member,
a second rigid, elongate beam member,
an awning member having a top side and a bottom side,
said awning member formed collectively by a plurality of longitudinally disposed, laterally interlocking slat members,
said awning member having a proximal end fixedly secured to a support surface and having a distal free end longitudinally spaced therefrom configured to have an arcuate bend or non-arcuate, angled bend formed therein,
said first and second beam members disposed transversely to said slat members in parallel, longitudinally spaced relation to one another, and positioned within said arcuate or non-arcuate bend on the bottom side of said awning member,
said first and second beam members configured to engage individual ones of said slat members,
a longitudinally disposed interconnecting member disposed in interconnecting relation to said first and second beam members,
said interconnecting member having an inwardly sloped bevel surface formed in each of its opposite ends,



said first and second beam members configured to abut associated ones of said beveled surfaces so that the respective upper portions of said beam members diverge relative to one another and their respective lower portions converge relative to one another,
and means for rigidly interconnecting said lower portions of said beam members to maintain said beam members in their abutting relation to said interconnecting member.

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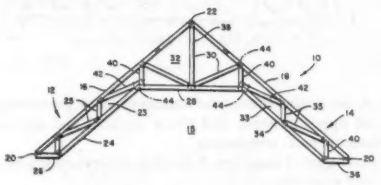
4,516,363

## SUPERINSULATION ROOF RAFTER TRUSSES AND BUILDING SYSTEM

Roger D. Beaulieu, Standish; William W. Alcorn, Cape Elizabeth, and David S. Matychowiak, Saco, all of Me., assignors to Super-Truss Building Systems, Inc., Gorham, Me.

Filed Apr. 22, 1983, Ser. No. 487,693
Int. Cl.[3] E04B 7/00
U.S. Cl. 52—90 21 Claims



1. A roof rafter truss structure comprising:
first and second outer rafter chords defining a roof gable from eave to eave with respective first and second sloping sides leading from the gable eaves to a gable ridge;
at least a first inner rafter hord parallel to and spaced from a portion of the first outer rafter chord extending from an eave part way to the gable ridge;
first deep webbing means comprising webs rigidly joining said first outer rafter chord and first inner rafter chord in parallel and spaced apart a sufficient distance to accommodate a depth of insulation for superinsulation with R factor of 60 or greater and with ventilation space over the insulation, said first outer rafter chord and first inner rafter chord defining a first superinsulation channel and ventilation space extending from a gable eave toward the gable ridge;
a horizontal ceiling joist chord positioned above and joined

to the upper end of the first inner rafter chord for defining and spanning a living space without obstruction;

second deep webbing means comprising webs rigidly joining and spacing the horizontal ceiling joist chord directly with the first and second outer rafter chords, said webs of the second deep webbing means being coupled to the horizontal ceiling joist chord on one hand, and on the other hand to the first and second outer rafter chords so that the ceiling joist chord is an integral part of the perimeter of the truss structure, said outer rafter chords and ceiling joist chord defining an attic space sufficient to accommodate a depth of insulation for superinsulation at an R factor of 60 or greater with ridge space ventilation above, said attic space communicating with the superinsulation channel;

said ceiling joist chord and deep webbing means tying the sloping first and second outer rafter chords of the roof gable together in a unitary structure, said ceiling joist chord and inner rafter chord partially defining a raised ceiling living space recessed within the roof gable below the roof rafter truss structure;

said outer rafter chords, inner rafter chord, and horizontal ceiling joist chord being tied together directly by said first and second deep webbing means to form a prefabricated integral eave-to-eave roof truss for subsequent incorporation in the roof of a building.

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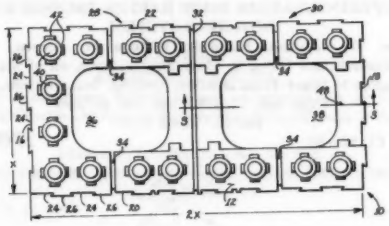
**4,516,364**

## INSULATING BLOCK AND A WALL THEREOF

**Richard M. Heider, 8002 E. del Tesoro Dr., Scottsdale, Ariz. 85258**

**Filed Sep. 30, 1982, Ser. No. 430,967**
**Int. Cl.³ E04C** *1/00, 1/10*
**U.S. Cl. 52—98** **10 Claims**



1. A generally rectangular insulating block presenting parallel and opposite upper and lower surfaces and end and side portions thereof, comprising:

a first series of matching dovetail mortises and tenons on said end portions;

a second series of said matching dovetail mortises and tenons on said side portions, said mortises and tenons for interlocking to an adjacent insulating block in a wall course;

a plurality of regularly spaced sockets formed in said bottom surface, each of said sockets having a central cavity surrounded by radially extending grooves;

a like plurality of regularly spaced posts on said top surface, each of said posts having a central projection surrounded by radially extending ribs for frictionally engaging said central cavity and surrounding radially extending grooves of one of said plurality of sockets in another insulating block of a superimposed wall course;

a pair of spaced apart bores communicating between said upper and lower surfaces;

first means extending around the outside of said block for facilitating the lateral bisecting of said block into generally equal size halves; and

second means for facilitating the lateral bisecting of said generally equal size halves into generally equal size quarters.

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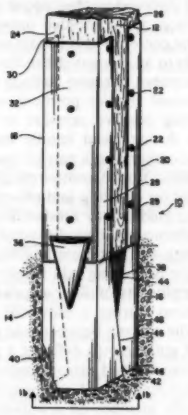
**4,516,365**

## SUPPORT ASSEMBLY AND METHOD

**Nicholas J. Chapman, 40587 Robin St., Fremont, Calif. 94538**

**Filed Nov. 12, 1982, Ser. No. 441,050**
**Int. Cl.³ E02D** *27/42*
**U.S. Cl. 52—170** **17 Claims**



1. An assembly for fixedly supporting a structural member with respect to an aperture, said assembly having a first and a second opposed surface, each of said surfaces having one end shaped to fixedly engage an end of the structural member, each of said assembly surfaces having a second end extending longitudinally beyond the end of the structural member, said second assembly surface ends being configured to enter the aperture and having opposed camming shapes which wedge said second surface ends into tight engagement with the aperture as said second assembly surface ends move further into the aperture, said opposed camming shapes being angular and extending toward one another at sides of said assembly, one of said camming shapes extending toward the opposing camming shape to a point short of a distal end of said one camming shape and then extending substantially parallel to the opposing camming shape toward the distal end.

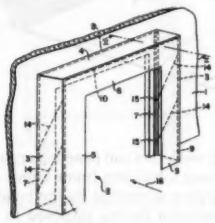
12. A method for repairing a post originally set in concrete and which has rotted below ground level, which comprises providing an attaching assembly comprising first and second brackets, each with a first end having camming surfaces configured to be driven into an aperture in the concrete originally formed around the post and expand the assembly into tight engagement with the aperture, and a second end configured for attachment to the post above ground level, positioning the first and second brackets in opposed relationship around the post, driving the first ends of the opposed brackets into the aperture, and fixedly attaching the second ends to the post.

4,516,366

## SEAL FOR THE GAP BETWEEN THE EDGE OF A BUILDING OPENING AND THE BACK END OF A VEHICLE DRIVEN UP TO IT

Kurt Alten, Ringstr. 14, D-3015 Wennigsen, Fed. Rep. of Germany

Filed Jul. 30, 1982, Ser. No. 403,579
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1981, 3130654
The portion of the term of this patent subsequent to Jan. 29, 2002, has been disclaimed.
Int. Cl.³ E06B 7/16
U.S. Cl. 52—173 DS 12 Claims



1. A deformable seal for a gap between the edges of an opening of a building and a back end of a vehicle driven up to said opening, said seal comprising in combination:

a rigid, inverted U-shaped frame which is spaced from said building and comprises first metallic profiled members;

inclined upwardly directed guides having a first and connected to said frame, and a second end which is operatively connected to said building so that said rigid, inverted U-shaped frame is held by said inclined upwardly directed guides unchangeable in height thereof;

an apron having a first outer edge fastened to said first metallic profiled members, and a second edge directed inwardly upon itself for effecting sealing with said vehicle so that said apron forms the actual seal and deforms when struck or contacted by a vehicle whereupon pressure is exerted upon said apron that leads to pivoting of said inclined upwardly directed guides;

second profiled members connected to said building; and

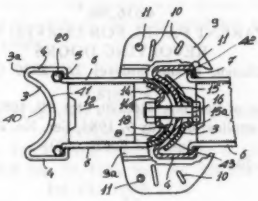
a flexible covering located between said apron and said building, said covering having a first edge fastened to said first metallic profiled members in the vicinity of said first outer edge of said apron, and a second edge fastened to said second profiled members; said profiled members being provided with undercut longitudinal grooves for insertion of at least one of said first outer edge of said apron, and said first and second edges of said flexible covering, said flexible covering and said apron being quickly replaceable and additionally distortions and deformations thereof are accepted without causing any special damage in operation therewith as a consequence thereof that inclined load forces are kept from leading to any tearing or ripping but rather lead to a resilient, elastically yieldable shifting of the associated edges so that relative height changes can be equalized through nominal shifting movements of said edges of said flexible covering in the longitudinal grooves and, consequently, rather than a rigid fastening there is provided a shiftable mounting and fastening.

4,516,367

## MODULAR SUPPORT FOR STAIRWAY STEPS

Roberto Molinazzi, Ozzano Emilia, Italy, assignor to Albini & Fontanot S.p.A., Rimini, Italy

Filed Dec. 20, 1982, Ser. No. 451,511
Claims priority, application Italy, Dec. 31, 1981, 3626 A/81
Int. Cl.³ E04F 11/00
U.S. Cl. 52—182 8 Claims



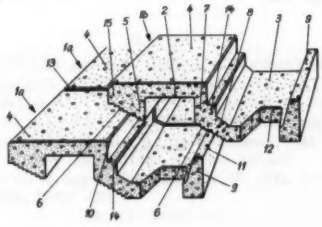
1. A modular support for stairway steps, adapted to be clamped with adjacent supports, characterized in that it comprises, as a unitary construction, a horizontal resting deck for a respective step, a first wall including a vertical cylindrical portion which defines an outer surface and an inner surface and extends above the resting deck, an additional wall including a vertical cylindrical portion which defines an outer surface and an inner surface and extends below said resting deck with its inner surface facing the inner surface of the first wall, said additional wall being attached on the outer surface thereof with said resting deck, said outer surface matching the outer surface of said first wall, and comprises at least one pair of clamping elements including each a portion respectively shaped to match the inner surface of said first wall and the inner surface of said additional wall for fastening the first wall of said support to the additional wall of an adjacent support.

4,516,368

## ADJUSTABLE STAIRWAY ELEMENT

Rudolf Pichler, Schubertweg 10, CH-3073, Gümligen, Switzerland

PCT No. PCT/CH80/00134, § 371 Date Aug. 3, 1981, § 102(e) Date Aug. 3, 1981, PCT Pub. No. WO81/01584, PCT Pub. Date Jun. 11, 1981
PCT Filed Nov. 10, 1980, Ser. No. 287,737
Int. Cl.³ E04F 11/14, 11/00
U.S. Cl. 52—190 1 Claim



1. A constructional unit for stairs, comprising

a stirrup-like bridge portion having an upper surface;

said upper surface of said bridge portion being of rectangular shape and having a corner portion located on the rear end of said bridge portion

a trough portion, connected to said bridge portion by an oblique portion, having a rectangular outer edge standing upright;

a cutout located at the side of said trough portion;

a front bridge pier on one side of said stirrup-like bridge portion terminating in a nose portion;

said nose portion having an underside formed with tooth-like shoulders;

a second bridge pier, having on the underside thereof tooth-like shoulders on the back side of said stirrup-like bridge portion.

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**4,516,369**

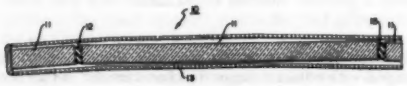
**TRANSPARENT PANEL FOR CURVED WALLS IN REVOLVING DOORS**

**Jorgen E. Olesen, Brams Sidevej 2A, 2920 Charlottenlund, Denmark**

**Continuation of Ser. No. 316,520, Oct. 29, 1981, abandoned. This application May 9, 1984, Ser. No. 608,535**

**Int. Cl.³ F06B** *3/90*

**U.S. Cl. 52—204** **5 Claims**



1. An approximately arcuate wall partially enclosing a revolving door comprising:

a plurality of high, narrow, generally rectangular strips of flat glass panes forming a transparent panel, each strip having a height corresponding to the height of said wall and a width of at least 3 inches, each strip subtending an angle not greater than 10 degrees as measured from the axis of rotation of said door, the difference in radial distance from said axis to the center and either edge of said strip not exceeding 5 mm;

joints of a flexible sealer connecting longitudinal edges of adjacent ones of said strips; and

an arcuate frame enclosing said panel of said plurality of high, narrow, generally rectangular strips of flat glass panes jointed by said joints for bending said panel to a desired arcuate configuration.

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**4,516,370**

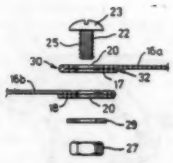
**SHEET METAL JOINT, STRUCTURE UTILIZING THE SAME, AND METHOD OF CONSTRUCTION**

**George T. Halmos, Willowdale, Canada, assignor to Delta Engineering Ltd., Willowdale, Canada**

**Filed Feb. 7, 1983, Ser. No. 464,554**

**Int. Cl.³ E04B** *1/32*

**U.S. Cl. 52—245** **10 Claims**



1. An edge joint between two pieces of metal sheet material, a marginal portion of each piece being folded back to lie adjacently along the main portion of that piece, the pieces being arranged so that the marginal portion of one piece is sandwiched between the main portions of the two pieces, and the main portion of the other piece is sandwiched between the marginal portions of the two pieces, a least one aperture in each piece passing through both of its portions, the apertures of the two pieces being aligned, and a fastener through said aligned apertures for joining the two pieces.

**4,516,371**

**INSULATION AND PANELING APPARATUS AND METHOD**

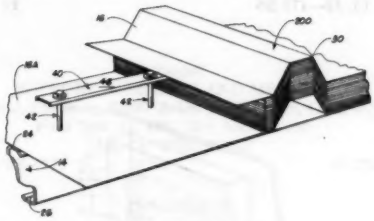
**Harold G. Simpson, Oklahoma City, Okla., assignor to Encon Products, Inc., Oklahoma City, Okla.**

**Continuation-in-part of Ser. No. 93,173, Nov. 13, 1979, Pat. No. 4,329,823. This application Nov. 17, 1981, Ser. No. 322,165**

**The portion of the term of this patent subsequent to May 18, 1999, has been disclaimed.**

**Int. Cl.³ E04B** *1/00*

**U.S. Cl. 52—269** **29 Claims**



1. An improved insulation and paneling apparatus for enclosing a building having a building frame comprising:

a first panel member supported by the building frame;

at least one insulation batting disposed to extend substantially adjacent to the first panel member;

a spacer member having a first support surface and an opposite second support surface;

fastener means for attaching the spacer member to a selected one of the first panel member and the building frame, the fastener means comprising:

a plurality of discreet column members connected to the spacer member before installation of the spacer member, the column members being shaped to penetrate a compressible material so that the characteristics of the insulation are substantially retained during the penetration of the insulation by the column members, each column member maintainable substantially in nonpenetrating engagement with the first panel member in the installed position of the spacer member; and

a plurality of fastener members attachable to the selected one of the first panel member and the building frame so that the column members are disposed between the spacer member and the first panel member, the first support surface being thereby disposed a predetermined distance from the first panel member, each fastener member attachable to the selected one of the first panel member and the building frame by the application of energy to one end of the fastener member to cause attachment of the other end of the fastener member;

a second panel member supported on the first support surface; and

attaching means for attaching the second panel member to the spacer member.

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**4,516,372**

**CONCRETE FORMWORK**

**George A. Grutsch, 6455 S. Meadowwood La., Missoula, Mont. 59803**

**Continuation of Ser. No. 293,033, Aug. 14, 1981,. This application Jul. 20, 1983, Ser. No. 515,222**

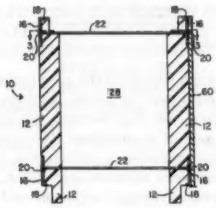
**Int. Cl.³ E04B** *2/00*

**U.S. Cl. 52—309.12** **16 Claims**

1. Permanent formwork for forming a concrete wall, wherein said formwork becomes part of the finished wall, said formwork comprising:

a panel assembly including at least first and second panels, said panels being spaced apart horizontally in a parallel relationship,

each of said panels having an interior and an exterior surface,
said panel assembly including means for stacking said panel assembly on another similar panel assembly,
first and second backing plates,
said first backing plate abutting the exterior surface of said first panel,
said second backing plate abutting the exterior surface of said second panel, and
said first and second backing plates lying entirely on the exteriors of said panels,
structural tieing means for tieing said first and second backing plates together, said tieing means being separate and distinct from said backing plates, said tieing means extending through the panels between and being connected to



said first and second backing plates to restrain outward movement of said panels,
wherein a number of said panel assemblies are stacked end-to-end and vertically to form said formwork,
said tieing means of adjacent said panel assemblies being spaced apart when said panel assemblies are stacked,
wherein said panels are comprised of a moldable plastic foam material which is relatively soft and weak, as compared to the material of which said plates are composed, said panel assemblies being sufficiently strong so that a stack of said panel assemblies is self-supporting during the pouring of the concrete therein,
said panels, plates and tieing means comprising means for becoming a part of the finished wall.

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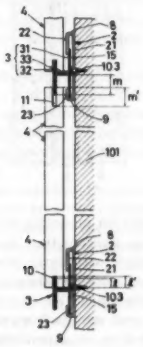
**4,516,373**

## APPARATUS FOR TILE-SETTING

**Yoshinori Osawa, 178, Oazasagami, Koga-cho, Koga-gun, shiga, Japan**

**Filed Oct. 19, 1982, Ser. No. 435,395**
**Claims priority, application Japan, Oct. 26, 1981, 56-171620; Dec. 9, 1981, 56-183842**
**Int. Cl.³ E04F *13/08***
**U.S. Cl. 52—387** **3 Claims**



1. An apparatus for setting a plurality of tiles having rectangular longitudinal grooves in a pair of opposite sides, comprising:
a plurality of horizontal bars, each having an H-shaped section with a first web means for connecting two flanges,
a plurality of horizontal bar holders having a second web means for connecting upper and lower tongues between which one of said two flanges is gripped, said upper tongue having a vertical length longer than the vertical length of said lower tongue, and
means, provided in the second web means, for allowing securement of each of the horizontal bar holders to a surface of plaster.

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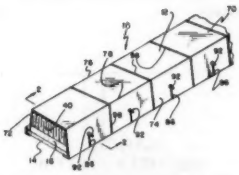
**4,516,374**

## MEANS FOR AND METHOD OF FURNACE INSULATION

**John F. Finney, 915 E. 15th, Winfield, Kans. 67156**

**Filed Sep. 27, 1982, Ser. No. 424,310**
**Int. Cl.³ E04B *1/74***
**U.S. Cl. 52—404** **25 Claims**



1. In structure for mounting ceramic fiber modules a pair of elongated retainer bar supports each having inner and outer ends with the inner end of each being adapted to be secured to a furnace wall, whereby the supports may be spaced from each other and secured perpendicularly to a wall to project their outer ends in spaced relation from the wall and from each other, an insulation module having an elongated retainer bar extending laterally therethrough, each of the supports being provided with holding means at its outer end for releasably holding an end portion of the retainer bar, said holding means comprising said support being bifurcated lengthwise from its outer end to a position spaced from its inner end to define a pair of fingers for receiving an end portion of the retainer bar therebetween, with such fingers being of a sufficiently malleable material to enable their being selectively bent to grip and pried apart to release an end portion of the retainer bar therebetween, said module being positioned intermediate the supports with the pairs of fingers respectively receiving therebetween and gripping the end portions of the retainer bar.

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**4,516,375**

## FRAMEWORK BLOCK OR BRICK CONSISTING OF MODULAR ELEMENTS OF FORMED SHEET STEEL OR ALUMINUM AND COMPRISING JOINTING MEANS

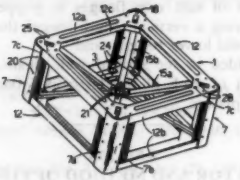
**Michele Pagano, Parco Comola, 147-Napoli, and Nicola Palumbo, Vico Belledonne a Chiaia, 9 Napoli, both of Italy**

**Filed Jan. 18, 1983, Ser. No. 458,848**
**Claims priority, application Italy, Jan. 29, 1982, 47691 A/82; Jul. 13, 1982, 35926/82[U]**
**Int. Cl.³ E04C *1/10***
**U.S. Cl. 52—581** **5 Claims**

1. A framework block or brick of sheet steel or aluminum which is press formed, which has the shape of a rectangular parallelepiped, which is of a modular framework structure, and which is formed by elements placed along the corners and the diagonals of the parallelepiped, comprising:
(a) two identical component elements having the shape of rectangular pyramids disposed with opposite vertices and the bases of which are the external facing surfaces of the block or brick; and

(b) four angle bars having a C-cross section and forming the corners perpendicular to the external facing surfaces,

wherein each of said component elements includes a base frame and two V-shaped elements or ribs which form the corners of the pyramid and extend and intersect such that



each V-shaped element forms a pair of opposite semidiagonals having a first flattened end for connection to the base frame at the corners thereof and a second flattened end corresponding to the vertex of the pyramid for connection to each other, the connections being made by fastening means.

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**4,516,376**

**ASSEMBLY SYSTEM**

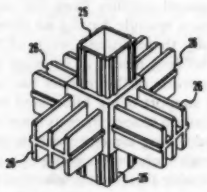
**Lionel W. King, 57, Lakedale Rd., Plumstead, London, England**

**Filed Jul. 16, 1982, Ser. No. 398,900**

**Claims priority, application United Kingdom, Feb. 24, 1982, 8205400**

**Int. Cl.³ E04H *12/00***

**U.S. Cl. 52—648** **4 Claims**



1. A system for assembling a structural framework, said system comprising a plurality of elongated structural members having hollow ends, and a plurality of coupling members adapted to be fit into said hollow ends for interconnecting said structural members, said coupling members being formed of resilient plastic material, each of said coupling members having a body portion and at least two coupling spigots which project outwardly from said body portion and which are engageable within said hollow ends, at least one of said spigots only comprising flat blades which extend outwardly from said body portion, said blades comprising a plurality of parallel blades extending from said body portion and and a single flat blade projecting outwardly from said body transverse to said parallel blades, said transversely extending blade having first and second ends and interconnecting said plurality of parallel blades, all of said parallel blades being located between said first and said second ends of said transversely extending blade, said blades having edges, said edges together defining an external profile which is discontinuous over the circumference of said spigot, said profile substantially extending over the length of said spigot, said profile generally corresponding in size and shape to a cross-section of one of said ends.

**4,516,377**

**ROLLABLE GRATING SYSTEM**

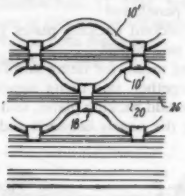
**Samuel Feller, Roide, Pont de Roide, France 25150**

**Filed Jan. 17, 1983, Ser. No. 459,041**

**Claims priority, application France, Jan. 18, 1982, 82 00669**

**Int. Cl.³ E04C *2/42***

**U.S. Cl. 52—660** **4 Claims**



1. In a rollable grating system of the type including a plurality of wavy tubes, and means for joining adjacent said tubes at adjacent waves thereof, the improvement wherein:

said tubes are formed of an anodized aluminum alloy;

said joining means comprise a connecting bar extending longitudinally between adjacent said tubes, and fasteners connecting respective pairs of adjacent said waves to the respective said bar;

said bar having therethrough longitudinal cavities, and longitudinal slots opening through opposite sides of said bar into respective said cavities; and

each said fastener comprises two portions, each said portion fitting around a respective said wave of a said pair of adjacent waves, and said portions of each said fastener having lugs extending through said slots and into said cavities of the respective said bar.

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**4,516,378**

**ANCHORING DEVICE**

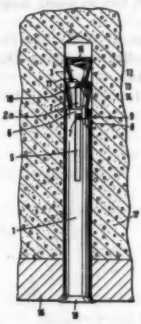
**Artur Fischer, Weinhalde 34, D-7244 Tumlingen Waldachtal 3, Fed. Rep. of Germany**

**Filed Apr. 4, 1983, Ser. No. 481,262**

**Claims priority, application Fed. Rep. of Germany, Apr. 20, 1982, 3214440**

**Int. Cl.³ E04C *5/12***

**U.S. Cl. 52—704** **11 Claims**



1. An anchoring device for mounting an object to a supporting structure of porous construction materials, particularly aerated cement or hollow structural blocks, comprising an expansible sleeve-shaped member adapted to be received and anchored in a hole formed in the structure, said sleeve-shaped member having a front end remote from said object and being formed with elongated slots; an expandable member having a conical outer face portion; an actuating screw insertable into said sleeve-shaped member and said expandable member to

cause the movement of said expandable member in an axial direction of the sleeve upon rotation of said actuating screw; and at least one intermediate expandable element with an internal thread to receive said actuating screw therethrough and positioned between the front end of the sleeve-shaped member and said expandable member and having a conical outer face portion, said intermediate element having a front end remote from said sleeve-shaped member and being formed with elongated slots extended from its front end over a portion of its length, said intermediate element being further formed with locking pins radially outwardly extended therefrom and engageable in the respective elongated slots of said sleeve-shaped member.

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**4,516,379**

## DEVICE FOR THE PACKAGING OF POWDER, GRANULATES AND LUMP, PASTY AND LIQUID MATERIALS TO BE PACKAGED BY MEANS OF A TUBULAR FILM

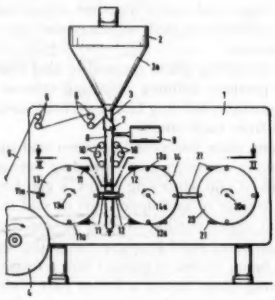
**Stewart Iain, Wuppertal, Fed. Rep. of Germany, assignor to Maschinenfabrik Fr. Niepmann GmbH & Co., Gevelsberg, Fed. Rep. of Germany**

**Filed Jul. 7, 1982, Ser. No. 395,947**

**Claims priority, application Fed. Rep. of Germany, Jul. 16, 1981, 3128043**

**Int. Cl.³ B65B *61/00***

**U.S. Cl. 53—138 A** **6 Claims**



1. In a device for the packaging of powder, granulates, slurries and viscous materials in a tubular film which is formed from an endless web of film by a forming shoulder into a tube which is filled by means of a filling pipe with the material to be packaged and subdivided at intervals by transverse closures which are each formed by a clip which is brought against the tubular film transverse to the direction of film movement by two cooperating gathering members which are brought against the tubular film from opposite sides to gather the tubular film and thereby form the transverse closure, the improvement wherein

two turret discs are arranged downstream of the filling pipe in the direction of movement of the tubular film and are driven in uniform rotation in opposite directions relative to each other, each of said turret discs carrying at least one of said gathering members which cooperate in pairs with each other, and

means for rotatably mounting the gathering members on said turret discs so as to be always oriented transversely to the direction of movement of the tubular film,

an additional disc arranged alongside one of the turret discs and means for driving said additional disc in opposite direction to, but with the same speed as, said one turret disc, said additional disc being provided with means for feeding clips which form the transverse closures, to the gathering members on said one turret disc,

said clip feeding means include support means on said additional disc extending parallel to the gathering members on said one turret disc, the number of said support means on said additional disc corresponding to the specific number of gathering members on said one turret disc,

said clip is U-shaped and each said support means is provided with a carriage which is displaceable in a longitudinal direction parallel to the transverse direction of movement of the gathering members, said support means having two pairs of grooves, each said pair of grooves to receive one of said U-shaped clips, ejector bars fastened to the support means for entry into respective pairs of said grooves upon relative movement of the carriage with respect to the support means, to transfer the clips to one of said gathering members while said discs are in motion.

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**4,516,380**

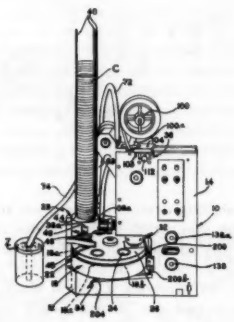
## PORTABLE APPARATUS FOR FILLING AND CLOSING CONTAINERS

**Leonard Buckner, Mount Eaton; William A. Foll, Sr., Wooster, and Stephen W. Pesho, Dalton, all of Ohio, assignors to Euclid Spiral Paper Tube Corp., Apple Creek, Ohio**

**Filed Sep. 17, 1982, Ser. No. 419,599**

**Int. Cl.³ B65B *3/00, 7/28***

**U.S. Cl. 53—282** **21 Claims**



1. A compact portable apparatus for filling an open-ended container with a substance, such as a liquid medication, and then heat sealing a thin flexible closure material to the periphery of the open end of the container to seal the latter, comprising a frame, a rotatable support mounted on said frame adapted to receive a plurality of the containers, a plurality of work stations on said frame adapted for coaction with said support, said work stations including means for inserting some of the substances into a container at one of said stations and comprising a container filling station, means for applying the closure material to the periphery of the substance filled container at another of said stations and comprising a container sealing station, means coacting with said support for facilitating removal of sealed containers from the support at a discharge station, and means for automatically indexing said support through a predetermined cycle, including rotary movement from said filling station to said sealing station, and thence to said discharge station, and including means for automatically feeding containers onto said support upon said indexing of said support about its axis and comprising a feeding station, and wherein said automatic container feeding means comprises a chute member, reciprocal container support-release means coacting with said chute member and adapted for generally transverse movement relative to the lengthwise axis of said chute member, and wherein in one position of said support-release means, being operable for retaining a stack of containers in positional relationship with respect to said chute member, and in another position of said support-release means adapted to cause gravity release of a lowermost container in the stack, and spring finger means normally coacting with said chute member in interfering relation to gravity movement of

containers past said chute member, for momentarily holding the released lowermost container from dropping onto said support, until said support-release means moves from said other position back towards said one position, to thereby cause deactivation of said finger means by forcing the latter outwardly out of said normal interfering relation with the momentarily held container to thereby permit dropping of the latter onto said support.

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**4,516,381**

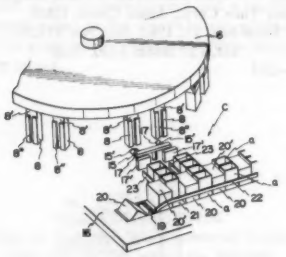
## AUTOMATIC CARTON PACKING MACHINE

**Mutsuhiko Nakajima, Soka, Japan, assignor to Ace Pak Company Incorporated, Japan**

**Division of Ser. No. 250,282, Apr. 2, 1981, Pat. No. 4,448,013. This application Aug. 16, 1983, Ser. No. 523,741**

**Int. Cl.³ B65B** *57/00*

**U.S. Cl. 53—375** **2 Claims**



1. A carton shifting device for use in an automatic carton packing machine, said carton shifting device comprising:

an intermittently rotatable, generally horizontally oriented disc having a plurality of downwardly extending mandrels, each for receiving a carton blank, said mandrels connected to said disc in pairs, each pair of mandrels having an outwardly facing surface lying in a common plane with a groove in said outwardly facing surface;

a withdrawing bar having a length to span a distance between each mandrel in a pair of mandrels and extending horizontally;

a pair of claws connected to said withdrawing bar, each claw positioned to engage one mandrel of a pair of mandrels;

drive means connected to said withdrawing bar for driving said withdrawing bar downwardly to move said claws in respective grooves of respective mandrels to remove a carton blank from each mandrel in a downward direction;

a horizontal table for receiving carton blanks from said mandrels;

a push-out bar positioned to push carton blanks on said table by a distance corresponding substantially to the width of one carton blank;

a guiding frame space from said withdrawing bar for receiving carton blanks pushed by said push-out bar and aligning said carton blanks in a pair of rows; and

a conveyor device arranged at an end of said guide frame, and for horizontal movement at a right angle to a direction in which said push-out bar pushes carton blanks, said conveyor device including a chain conveyor and a plurality of rectangular blocks to secure to said chain conveyor at spaced locations on said chain conveyor with a space between adjacent blocks corresponding to a length of a carton blank to be pushed by said push-out bar, each block having a width at least twice the width of a carton blank for accommodating two carton blanks in each space between adjacent blocks in side to side relationships.

**4,516,382**

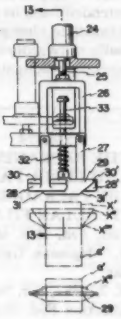
## AUTOMATIC CARTON PACKING MACHINE

**Mutsuhiko Nakajima, Soka, Japan, assignor to Ace Pak Company Incorporated, Japan**

**Division of Ser. No. 250,282, Apr. 2, 1981, Pat. No. 4,448,013. This application Aug. 16, 1983, Ser. No. 523,742**

**Int. Cl.³ B65B** *57/00, 19/24*

**U.S. Cl. 53—375** **5 Claims**



1. A folding device for imparting a folding habit to the open top of a carton wherein the top includes a pair of top sections which are folded and sealed together comprising:

a frame secured to a shaft which is movable upwardly and downwardly;

a pair of squeezing plates secured to said frame and having lower portions defining opposing tapered surfaces and upper portions defining facing vertical surfaces which are spaced from each other;

a deforming plate interposed between said squeezing plates and having an upper part extending between said upper portions of said squeezing plates, a gap being formed on opposite sides of said upper part of said deforming plate and said upper portion of each of said squeezing plates, each gap being sized to allow one of the top sections of a carton being folded to project into a respective gap, said deforming plate having a lower part with edges which extend obliquely with respect to each other; and

vertically yielding mounting means connected between said deforming plate and said frame for supporting said deforming plate for resilient upward movement with respect to said squeezing plates, said deforming plate having a lower position defined by said mounting means with said gaps being present in said lower position of said deforming plate.

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**4,516,383**

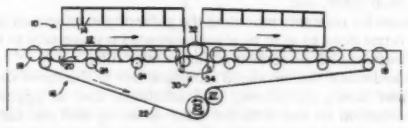
## METHOD AND APPARATUS FOR PACKAGING CONTAINERS

**Horst F. W. Arfert, Midlothian, Va., assignor to Reynolds Metals Company, Richmond, Va.**

**Filed Sep. 23, 1983, Ser. No. 535,060**

**Int. Cl.³ B65B** *3/02*

**U.S. Cl. 53—410** **11 Claims**



1. In a method of packaging containers comprising placing said containers in a tray, said tray having apertures in the bottom corners thereof, and wrapping said tray with a plastic

film to form a unitary package the improvement comprising passing said package along a conveyor, contacting the front bottom corners of said package with heated surfaces to burn apertures in said film in registry with said apertures in the front bottom corners of said tray, passing said package over said heated surfaces and contacting the rear bottom corners of said package with said heated surfaces to burn apertures in said film in registry with said apertures in the rear bottom corners of said tray.

5. In an apparatus for conveying plastic film wrapped packages comprising a conveying surface the improvement comprising a heater means for forming aperatures in said plastics film comprising a pair of surfaces for contacting the bottom corners of said packages, means for lifting said packages over said surfaces and means for heating said surfaces.

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**4,516,384**

## METHOD AND APPARATUS FOR OPENING AND LOADING FLEXIBLE CONTAINERS

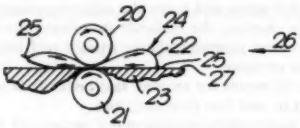
**Nino Imperiale, Milan, Italy, assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.**

**Filed Dec. 31, 1981, Ser. No. 336,231**

**Claims priority, application United Kingdom, Mar. 16, 1981, 8108129**

**Int. Cl.³ B65B** *43/30, 43/28, 43/34*

**U.S. Cl. 53—459** **20 Claims**




1. A process for opening and loading flexible containers each having a mouth defined between first and second superposed flexible panels, such process comprising the steps of:

(a) establishing non-slip contact of first and second movable members with respective portions of said first and second panels of a said flexible container at a container-opening station;

(b) mechanically displacing the contacted portions of the first and second panels in opposite directions by sliding the first panel over the second, said sliding displacement causing the edges of said flexible container to roll and separate the panels near said edges;

(c) inserting container-spreading means into the thus opened gap between said first and second panels;

(d) spreading said flexible container to grasp it on said spreading means; and

(e) displacing the spreading means from said opening station to a loading station to transport the thus grasped flexible container thereon.

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**4,516,385**

## WRAPPING MACHINE

**Don H. Lenker, and Dennis F. Nascimento, both of Salinas, Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed May 20, 1982, Ser. No. 380,374**

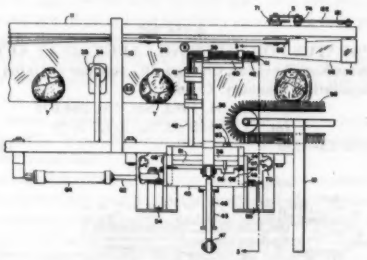
**Int. Cl.³ B65B** *9/02*

**U.S. Cl. 53—504** **10 Claims**

1. An apparatus for the continuous wrapping of objects in heat-sealable film which is particularly adapted for the wrapping of three-dimensional objects which have a poorly-defined shape or which are non-uniform in size or shape, comprising:

(a) a frame;

(b) a conveyor assembly for advancing the film and the object and for bringing the film into a wrapping relationship with the object, wherein said conveyor assembly comprises V-positioned endless belts which converge adjacent to the area where the film is sealed, said belts having brads affixed thereto to advance the film so that the edges of the film converge and the center portion of the film sags downward to form a V-shaped trough adapted to contain three-dimensional objects which have poorly-defined shape or which are non-uniform in size or shape, and so that the edges of the film further converge to wrap the film peripherally about the object;



(c) a sealing assembly for bringing the sides of the film containing the object into a heat-sealable relationship and for sealing the film to sealably enclosed the object;

(d) an indexing carriage for advancing said sealing assembly at the same rate as said conveyor assembly; and

(e) means for detecting the object and actuating said sealing assembly to seal the film while the film is advancing.

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**4,516,386**

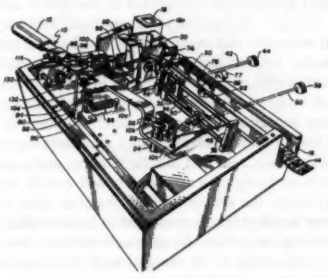
## SEMI-AUTOMATIC SLIDE MOUNTER WITH ANTI-REVERSE OPERATING LEVER

**Armer J. Willenbring, Bloomington, Minn., assignor to Pako Corporation, Minneapolis, Minn.**

**Filed May 9, 1980, Ser. No. 144,284**

**Int. Cl.³ B65B** *63/00*

**U.S. Cl. 53—520** **9 Claims**



1. An apparatus for mounting a photographic film transparency into a slide frame comprising:

slide holder means for holding a plurality of slide frames;

a slide track;

slide advance means for advancing a slide frame from the slide holder means along the slide track;

film advance means for feeding the transparency, while still an integral portion of a film web, into an insertion opening of the slide frame;

knife means for severing the transparency from the web;

operating lever means operatively connected to the slide advance means, the film advance means and the knife

means, the operating lever means being movable in a first direction through a closed path having a plurality of path segments to provide operation of the slide advance means, the film advance means, and the knife means during an operating cycle; and

anti-reverse means operably connected to the operating lever means for preventing the operating lever means from moving in a second, reverse direction in the closed path.

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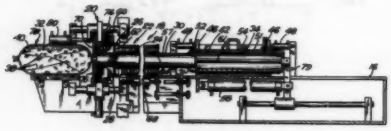
**4,516,387**

## APPARATUS FOR STUFFING LARGE MEAT ARTICLES

**Vytautas Kupcikevicius, Chicago, Ill., assignor to Union Carbide Corporation, Danbury, Conn.**

**Filed Mar. 31, 1982, Ser. No. 364,075**
**Int. Cl.³ B65B** *63/02, 3/12, 3/18*
**U.S. Cl. 53—530** **11 Claims**



1. In an apparatus for stuffing large meat articles into discrete lengths of flexible tubular casing comprising, in combination: a frame; a stuffing horn mounted on said frame, having a discharge end and an inlet end; an article-loading chamber in communication with the inlet end of the stuffing horn; a compression member extending longitudinally in said article-loading chamber, movable between a retracted position and an extended position; piston means disposed in longitudinally axial alignment with the article-loading chamber and stuffing horn, having an article contacting face; actuating means operably connected to said piston means arranged and disposed to move said piston means in multistage operations sequentially in a first stage through said article-loading chamber, and in a second stage through said stuffing horn to the discharge end thereof; and a shirred casing supply disposed coaxially on the stuffing horn arranged and disposed to provide a continuous deshirred casing to be stuffed with said meat articles; the improvement whereby said meat articles can be packaged without substantial loss of liquidous materials contained in said articles; said improvement comprising, in combination:

(a) a first stage piston comprising a first elongated tubular member and an annular piston head mounted to the forward end of said tubular member and carrying an article contacting face, said first tubular member and said annular piston head being of a size which will enable both to fit snugly inside the article-loading chamber after said compression member has been moved to its extended position, and having a combined length such that they are substantially coextensive in the longitudinal direction with said article-loading chamber; and

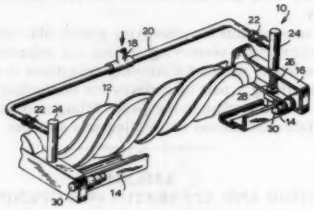
(b) a second stage piston comprising a pneumatic cylinder having an outer tubular wall forming a second enlongated tubular member having a separate article contacting face, coaxially mounted inside the first elongated tubular member of said first stage piston, the outer tubular wall of said pneumatic cylinder being of a size which will enable it to fit snugly inside said stuffing horn and having a length such that said outer tubular wall is substantially coextensive in the longitudinal direction with said stuffing horn, said pneumatic cylinder including an actuating rod extending outwardly from an end thereof in a direction opposite to the stuffing horn, said actuating rod being permanently anchored in a stationary position.

**4,516,388**

## HYDRAULIC BEDKNIFE ADJUSTER FOR REEL-TYPE MOWING EQUIPMENT

**Noel W. Chandler, 114 Venus St., Jupiter, Fla. 33458**

**Filed Sep. 12, 1979, Ser. No. 74,656**
**Int. Cl.³ A01D** *55/20*
**U.S. Cl. 56—249** **8 Claims**



1. In a reel-type mower having a reel blade and a bedknife movably attached thereto, a system for precisely positioning and retaining the bedknife at a predetermined distance relative to the blade, comprising:

means for hydraulically adjusting and locking a bedknife relative to a reel blade at a desired relative position;

means for actuating said hydraulic adjusting means;

a means for moving the bedknife in a first direction to a predetermined position relative to said reel blade under hydraulic pressure;

resilient force means for moving said bedknife in a counter direction to said first direction; and

means for displacing a predetermined amount of hydraulic fluid to allow displacement of said bedknife from a first maximum position in said first direction to a second position in said counter direction relative to the amount of fluid displaced.

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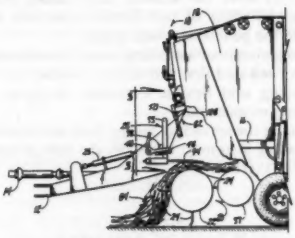
**4,516,389**

## ROUND HAY BALING MACHINE

**Grant M. Core, Rte. #3, Knoxville, Iowa 50138**

**Filed Sep. 4, 1984, Ser. No. 646,460**
**Int. Cl.³ A01D** *59/00, 89/00*
**U.S. Cl. 56—341** **5 Claims**



1. An improved round hay baling machine having a frame with forward and rearward ends, a baling chamber supported on said frame, a pickup assembly mounted on said frame forwardly of said baling chamber, a windguard assembly pivotally connected to said frame above said pickup assembly, a latch assembly pivotally secured to said frame and having a stop element for normally limiting the pivotal movement of said windguard, and a twine tie assembly operatively connected to said frame and including a hydraulic cylinder means having a first end pivotally connected to said frame and a spaced apart second end, a twine wrapper activator having a first end pivotally connected to said second end of said hy-

daulic cylinder means and a spaced apart second end, and an elongated twine wrapper arm having a first end pivotally connected to said frame and a second end pivotally connected to said activator such that actuation of said hydraulic cylinder means pivots said second ends of said activator and said wrapper arm downwardly, said improvement comprising:

cable means having first and second opposite ends attached to said twine tie assembly and to said latch assembly, respectively, such that actuation of said hydraulic cylinder means pulls on said cable means thereby raising said latch assembly to allow said windguard assembly to pivot beyond said stop element whereby an accumulation of hay passes beneath said windguard assembly into said baling chamber,

first connection means for securing said first end of said cable means to said twine tie assembly, and

second connection means for securing said second end of said cable means to said latch assembly.

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**4,516,390**

## APPARATUS AND METHOD OF PICKING UP AND CONVEYING CUT CROP

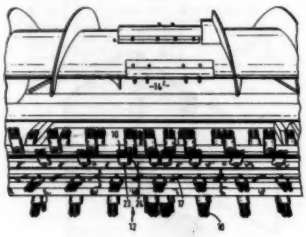
**Wilfred E. Klinner, Milton Keynes, England, assignor to National Research Development Corporation, London, England**

**Continuation-in-part of Ser. No. 173,136, filed as PCT GB 79/00053, Mar. 30, 1979, published as WO 79/00863 Nov. 1, 1979, § 102(e) date Nov. 30, 1979 abandoned. This application Aug. 17, 1982, Ser. No. 408,883**

**Claims priority, application United Kingdom, Mar. 31, 1978, 12703/78**

**Int. Cl.³ A01D *89/00***

**U.S. Cl. 56—364** **21 Claims**



1. Apparatus for picking up and conveying cut grass and other cut fibrous fodder crop, comprising

a mobile frame for movement over the ground,

a crop conveying rotor for picking up and conveying cut grass and other cut fibrous fodder crop, said rotor being mounted on said mobile frame in a position close to the ground for picking up crop from the ground, but with the lowest part of said rotor spaced from the normal ground surface,

said conveying rotor comprising a brush-like structure having a multiplicity of stiff, resilient, outwardly directed, elongate elements for picking up and conveying the crop by an action including relative movement between the conveying elements and the crop engaged thereby, the elements being yieldable in response to engagement with the crop but being sufficiently stiff to penetrate at least part of a stream of crop conveyed by the rotor, the elements being yieldable at least predominantly by bending of the elements along at least part of the crop engaging portions of the lengths thereof, and the elements being sufficiently stiff to return to their undeflected dispositions when free from engagement with crop at least predominantly by virtue of the stiffness of the elements,

said brush-like structure comprising spaced-apart, discrete tufts of crop engaging elements, each tuft being formed of a plurality of lengths of resilient, synthetic material doubled over and secured to a supporting base by a securing member passing through the fold of the doubled-over elements lengths, the doubled-over material being secured in a sleeve of resilient material which supports and protects the tuft of elements at the base thereof, the discrete tufts of elements being arranged so that tufts which are adjacent to each other along a direction parallel to the axis of rotation of the rotor are spaced-apart from each other at the distal ends of the tufts so as to leave gaps between adjacent tufts, the axial positions of the brush tufts being staggered around the rotor so that upon rotation of the rotor the gaps between the spaced-apart tufts presented to the crop are filled at least partly by succeeding tufts presented to the crop during the rotation,

a housing extending over the front of the crop conveying rotor and forming a crop flow passage between the rotor and the housing,

outlet means forming an outlet from said passage leading rearwardly from said rotor for discharging crop released by the rotor, and

drive means for rotating the crop conveying rotor about an axis substantially parallel to the ground in such a manner as to pick-up cut crop and convey the crop upwardly and rearwardly over the rotor along the passage,

said drive means including means for coupling said rotor to a power source for driving said rotor in rotation independently of forward movement of the mobile frame and at a rotational speed sufficient to pick-up the crop by a stiff brushing action and to detach crop from the rotor by centrifugal effect and discharge the crop rearwardly through said rearward outlet formed by the outlet means.

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**4,516,391**

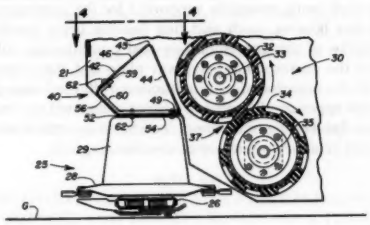
## LIGHT HAY BAFFLE FOR DISC MOWER-CONDITIONER

**Kenneth W. McLean, New Holland, Pa., assignor to Sperry Corporation, New Holland, Pa.**

**Filed Mar. 2, 1984, Ser. No. 585,675**

**Int. Cl.³ A01D *43/10***

**U.S. Cl. 56—16.4** **12 Claims**



1. A hay harvesting machine having a mobile frame including transversely spaced side sheets; crop conditioning means rotatably supported by said frame to condition crop received thereby; rotary cutting means supported by said frame forwardly of said conditioning means to sever standing crop material and convey the severed crop material rearwardly toward said conditioning means, said rotary cutting means having a plurality of transversely spaced disc cutters rotatably mounted on a transverse cutterbar, each said disc cutter having at least one knife mounted thereon to sever standing crop by impact action upon rotation of said disc cutters; and drive means for rotatably driving said conditioning means and said rotary cutting means, the improvement comprising:

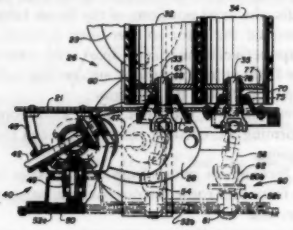
a transverse baffle positioned above said rotary cutting means and forwardly of said conditioning means to assist in directing the flow of severed crop material from said rotary cutting means into said conditioning means.

**4,516,392**

## CONDITIONING ROLL DRIVE MECHANISM

**Kenneth W. McLean, and John K. Hale, both of New Holland, Pa., assignors to Sperry Corporation, New Holland, Pa.**

**Filed Mar. 2, 1984, Ser. No. 585,676**
**Int. Cl.³ A01D *82/00***
**U.S. Cl. 56—16.4** **4 Claims**



1. A hay harvesting machine having a mobile frame defining opposing lateral sides; upper and lower transverse conditioning rolls supported by said frame to condition crop passing therebetween, each said conditioning roll having opposing ends being rotatably mounted by first and second bearings adjacent, respectively, the opposing lateral sides; crop cutting and conveying means supported by said frame to sever standing crop material and convey the severed crop material to said conditioning rolls to be fed therebetween; and drive means for operatively powering said crop cutting and conveying means and the rotation of said conditioning rolls, the improvement comprising:

said conditioning rolls having a generally tubular construction with a support plate recessed inside each respective said conditioning roll and positioned generally perpendicular to the respective axis of rotation, each said support plate having a stub shaft extending therefrom toward the corresponding end of the conditioning roll, the first bearing for each said conditioning roll being mounted in a housing cup, each said stub shaft being rotatably supported by the corresponding said first bearing, each said first bearing being positioned internally of the corresponding said conditioning roll between the corresponding support plate and the respective end of the corresponding conditioning roll, the housing cup for said upper conditioning roll being connected to a biasing means for biasing said upper conditioning roll toward a position relative to said lower conditioning roll.

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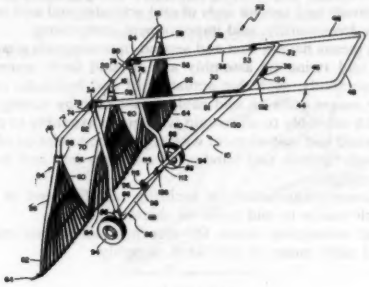
**4,516,393**

## WHEELED PUSH RAKE

**Phillip E. Lambert, Rte. 2, Zimmerman, Minn. 55398**

**Filed Sep. 6, 1983, Ser. No. 529,344**
**Int. Cl.³ A01D *7/00***
**U.S. Cl. 56—400.2** **16 Claims**

1. A push rake comprising a first frame unit including a handle member, a second frame unit, wheel means on said second frame unit for traversing the ground to be raked, means connecting said first frame unit to said second frame unit for pivotal movement of said first frame unit about an axis spaced from said wheel means, rake means rigidly mounted on said first frame unit forwardly of said wheel means, and a spring mechanism connected to said first frame unit at a first location spaced rearwardly from said connecting means and to said second frame unit at a second location spaced downwardly



from said connecting means and rearwardly of said rake means for yieldingly biasing said frame units relative to each other.

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**4,516,394**

## YARN PACKAGE FOR SPIRALERS

**Gilbert C. Bell, and Harry W. Stanhope, both of Charlotte, N.C., assignors to Celanese Corporation, New York, N.Y.**

**Filed Sep. 7, 1982, Ser. No. 415,100**
**Int. Cl.³ D02G *3/40, 3/02, 3/44;* B65H *55/00***
**U.S. Cl. 57—234** **8 Claims**

1. An improved feed stock package of yarn for a high speed spiraling machine suitable for the manufacture of reinforced hose, which package comprises a rotatable support and filamentary yarn wound about the support, the filamentary yarn having a twist of less than 3 turns per inch wherein the improvement comprises: said rotatable support is a king spool and said yarn is up to about 7 pounds of an adhesive-treated yarn having from 1% to 8% by weight of adhesive material said adhesive material having the ability to increase the bond strength of said yarn in said hose.

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**4,516,395**

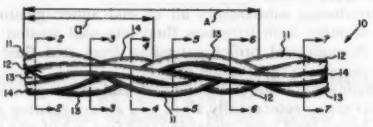
## METALLIC CABLE FOR REINFORCING ELASTOMERIC ARTICLES

**Kenneth J. Palmer, Wadsworth; Dennis R. Brandyberry, Canton, and Grover W. Rye, Cuyahoga Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Aug. 23, 1983, Ser. No. 525,540**
**Int. Cl.³ D02G *3/48***
**U.S. Cl. 57—237** **6 Claims**

1. A metallic cable for reinforcing elastomeric articles comprising two strands twisted together and having a cable lay

length, each of said strands comprising two filaments twisted together and said strands each having a strand lay length, the



strand lay length of said strands being equal to one another but being less than said cable lay length by between 25% and 75%.

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**4,516,396**

## OPEN END YARN SPINNING APPARATUS

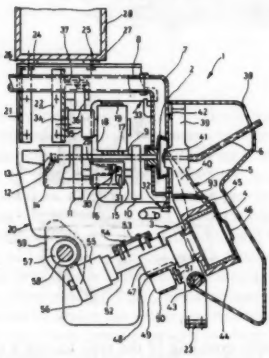
**Fritz Stahlecker, Josef-Neidart-Str. 18, Bad Überkingen, Fed. Rep. of Germany, and Hans Raasch, Monchen-Gladbach, Fed. Rep. of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany**

**Filed Nov. 17, 1983, Ser. No. 552,741**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1982, 3247411**

**Int. Cl.³ D01H 7/882**

**U.S. Cl. 57—407** **22 Claims**



1. In an open end yarn spinning apparatus comprising a plurality of side by side spinning positions arranged longitudinally along the apparatus, and characterized in that the internal components of each spinning position are readily accessible without affecting adjacent positions, and with each spinning position including a circular spinning rotor having a rotor shaft coaxially fixed thereto; bearing means rotatably mounting said rotor shaft while permitting the axial withdrawal of said rotor and shaft; a rotor housing generally surrounding the periphery of said spinning rotor and having a rear wall with an opening receiving said rotor shaft therethrough; fiber delivery means including a feed roll and an opening roll for delivering fibers to said spinning rotor; and a cover pivotally mounted so as to selectively overlie such position, the improvement wherein said rotor housing of each spinning position is separate from the rotor housings of adjacent positions and wherein said yarn spinning apparatus further comprises

a central frame extending longitudinally along the length of the apparatus,

a frame subassembly fixedly mounted to said central frame at each of said spinning positions,

means mounting said bearing means of each spinning position to the associated frame subassembly,

means mounting said feed roll and said opening roll of said fiber delivery means of each spinning position to the associated frame subassembly, and

means releaseably mounting said rotor housing of each spinning position to the associated frame subassembly and so that the rotor housing of each spinning position may be separately removed without affecting the adjacent positions,

whereby the internal components of each spinning position are readily accessible by opening its cover and removing the rotor and rotor shaft, and the rotor housing.

4. In an open end yarn spinning apparatus comprising a plurality of side by side spinning positions arranged longitudinally along the apparatus, and characterized in that the internal components of each spinning position are readily accessible without affecting adjacent positions, and with each spinning position including a spinning rotor having a forward side adapted to receive fibers, and a rearward side having a rotor shaft coaxially fixed thereto; bearing means rotatably mounting said rotor shaft while permitting the axial withdrawal of said rotor and rotor shaft in the forward direction; a rotor housing generally surrounding the periphery of said rotor and having a rear wall with an opening receiving said rotor shaft therethrough; fiber delivery means including a feed roll, an opening roll, and a fiber delivery duct for delivering fibers to the forward side of said rotor; a cover pivotally mounted so as to selectively overlie such position, with said cover mounting a closure insert which is adapted to overlie the forward side of said rotor when the cover is closed and with said closure insert including at least a portion of said fiber delivery duct and a yarn removal duct, the improvement wherein said yarn spinning apparatus further comprises

a central frame extending longitudinally along the length of the apparatus,

a frame subassembly fixedly mounted to said central frame at each of said spinning positions, with each frame subassembly comprising a pair of longitudinally spaced apart side members fixed to said central frame and extending generally parallel to each other in the transverse direction, and support means extending longitudinally between and fixed to each of the associated side members,

means mounting said bearing means of each spinning position to the associated frame subassembly,

means mounting said feed roll and said opening roll of said fiber delivery means of each spinning position to the associated frame subassembly, and

means releaseably mounting said rotor housing of each spinning position to the associated frame subassembly and without engaging the frame subassemblies of the adjacent spinning positions,

whereby the internal components of each spinning position are readily accessible by opening its cover and removing the rotor and rotor shaft, and the rotor housing.

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**4,516,397**

## METHOD AND DEVICE FOR INCREASING THE HAIRINESS AND THE BULKINESS OF A THREAD

**Hans Raasch, and Heinz-Georg Wassenhoven, both of Monchen-Gladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Monchen-Gladbach, Fed. Rep. of Germany**

**Filed May 31, 1983, Ser. No. 499,193**

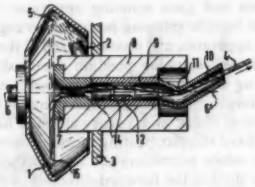
**Claims priority, application Fed. Rep. of Germany, May 29, 1982, 3220402**

**Int. Cl.³ D01H 7/882**

**U.S. Cl. 57—417** **14 Claims**

1. Method of increasing the hairiness and bulkiness of a thread, in an open-end rotor spinning machine having a deflection ring disposed concentric to the axis of rotation of the rotor, which comprises continuously withdrawing the thread through the deflection ring substantially along the direction of the axis of rotation of the rotor, forming a thread balloon with the thread having a maximum diameter larger than the inner diameter of the deflection ring, bringing the thread in contact with a multiplicity of separately disposed balloon disturbance elements, and thereby changing the diameter of the thread balloon several times during each revolution of the thread balloon:

4. In a device for increasing the hairiness and bulkiness of a thread in an open-end rotor spinning machine, having a rotor with an axis of rotation and a deflection ring disposed concentric to the axis of rotation of the rotor, the thread being continuously drawn through the deflection ring substantially along the direction of the axis of rotation of the rotor, the improvement comprising a thread balloon guide following said deflection ring for forming a thread balloon having a larger maximum diameter than the inner diameter of said deflection ring, said thread balloon guide having balloon disturbance elements for contacting the thread and changing the diameter of the thread balloon, said balloon disturbance elements being annularly and separately disposed in said thread guide.



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**4,516,398**

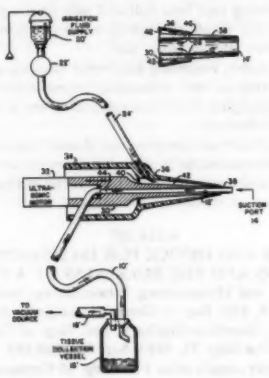
## METHOD OF USE OF AN ULTRASONIC SURGICAL PRE-ASPIRATOR HAVING A ORIFICE BY-PASS

**David G. Wuchinich, New York, N.Y., assignor to Cooper LaserSonics, Inc., Santa Clara, Calif.**

**Continuation of Ser. No. 195,205, Oct. 8, 1980, abandoned, which is a continuation of Ser. No. 34,717, Apr. 30, 1979, abandoned, which is a division of Ser. No. 895,217, Apr. 10, 1978, abandoned. This application Jun. 5, 1984, Ser. No. 617,146**

**Int. Cl.³ A61B** *17/20*

**U.S. Cl. 604—22** **1 Claim**



1. A method for preventing clogging of a surgical aspirator with fragmented tissue and blood removed from a surgical site by aspiration through a suction passage of said surgical aspirator, said aspirator comprising an ultrasonic tool having a longitudinal axis and a free end portion adapted to ultrasonically vibrate along said axis of said tool, a suction passage extending through said tool generally parallel to said axis, said suction passage defining a suction port at said free end portion, a sleeve coaxially surrounding said tool and spaced therefrom and extending substantially to said free end of said tool to define an annular fluid supply passage having an annular orifice surrounding said tool, and at least one orifice extending through said tool from said fluid supply passage to said suction passage, said orifice disposed adjacent said free end of said tool and wherein said method comprises: ultrasonically framgenting tissue causing bleeding and body fluid excretes;

supplying an anticoagulating and irrigating fluid to said fluid supply passage;

introducing substantially all of said anticoagulating fluid together with irrigation fluid into said suction passage through said orifice extending from said fluid supply passage to said suction passage;

diluting said tissue and blood with said anticoagulating fluid;

preventing substantially all of said anticoagulating and irrigating fluid from contacting said free end of said tool and from reaching the surgical site through the tool so as to prevent excessive bleeding at the surgical site and to further prevent atomization of said anticoagulating and irrigating fluids with said free end of said ultrasonic tool; and

aspirating fragmented tissue, body fluids, anticoagulant and irrigation fluids.

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**4,516,399**

## HYDRAULIC COUPLING

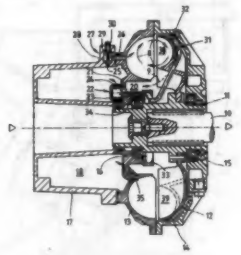
**Heinz Höller, and Wolfgang Weber, both of Crailsheim, Fed. Rep. of Germany, assignors to Voith Turbo GmbH & Co. KG, Crailsheim, Fed. Rep. of Germany**

**Filed Oct. 20, 1983, Ser. No. 543,530**

**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1982, 3240334**

**Int. Cl.³ F16D** *33/12*

**U.S. Cl. 60—351** **15 Claims**



1. A hydraulic coupling of the type having a constant volume of operating fluid comprising

a bladed primary wheel and a bladed secondary wheel having an operating space therebetween,

said bladed primary wheel having a plurality of circumferentially spaced radially extending blades and being provided with a blade-free ram space adjacent to the inner radius of the blades of the primary wheel,

said bladed primary wheel including means defining a delay chamber fixedly mounted to the primary wheel for rotation therewith, first channeling means for passing an operating fluid from said ram space to said delay chamber, first valve means for closing said first channeling means when a primary rotation speed is greater than a first switching speed,

second channeling means for passing the operating fluid from the delay chamber to the operating space, second valve means closing said second channeling means, said second valve means being operable to open said second channeling means when the primary rotation speed is greater than a second switching speed,

a scoop tube fixedly mounted to said bladed secondary wheel for rotation therewith, said scoop tube having an inlet opening proximate the radially outer periphery of the bladed secondary wheel open to said operating space and an outlet opening proximate a radially inner zone of the coupling adjacent to the ram space, and

speed responsive means for selectively passing operating fluid from said scoop tube to the delay chamber only when the primary rotational speed is less than a third switching speed,

said operating fluid from said scoop tube otherwise being returned to said operating space.

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**4,516,400**

## MASTER CYLINDER ASSEMBLY FOR A VEHICLE BRAKING SYSTEM

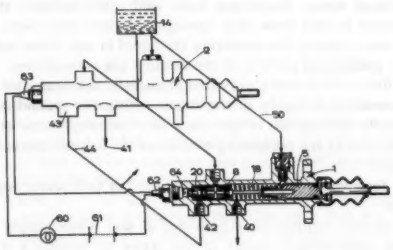
**Michael K. Tarplee, Birmingham, England, assignor to Lucas Industries public limited company, Birmingham, England**

**Filed May 4, 1982, Ser. No. 374,693**

**Claims priority, application United Kingdom, May 15, 1981, 8115016**

**Int. Cl.³ F15B 7/00**

**U.S. Cl. 60—535** **6 Claims**



1. A master cylinder assembly for a vehicle hydraulic braking system comprising a pair of master cylinders, each said master cylinder comprising a housing having a bore, a closure for one end of said bore, a pedal-operated primary piston working in said bore, a secondary floating piston working in a portion of said bore between said primary piston and said closure, a primary pressure space defined in said bore between said primary and secondary pistons, and a secondary pressure space defined in said bore between said secondary piston and said closure, wherein said primary pressure spaces are adapted to be connected to brakes on wheels on opposite sides of the vehicle, said secondary pressure spaces are both connected to a common auxiliary braking system, a transfer passage provides communication between said primary pressure spaces when said master cylinders are operated simultaneously, transfer valve means are operative to cut off communication between said primary pressure spaces when one of said master cylinders is operated on its own, and said secondary pressure spaces are adapted to operate said auxiliary braking system only when said two master cylinders are operated simultaneously, each said secondary piston being provided with passage means in communication at all times with a reservoir for fluid, and normally open primary and secondary recuperation valves provide communication between said passage means and said primary and secondary pressure spaces when said pistons are in retracted positions, simultaneous operation of both said master cylinders causing both pairs of said primary and secondary recuperation valves to close followed by pressurisation of the fluid in both said pairs of primary and secondary pressure spaces whereby to apply simultaneously the brakes on opposite sides of the vehicle and to operate said auxiliary braking system, and operation of one of said master cylinders on its own causing said primary and secondary recuperation valves of the said one master cylinder to close followed by pressurisation of the fluid in said primary pressure space but with fluid in said secondary pressure space being displaced to said reservoir through the open secondary recuperation valve of the other, inoperative, master cylinder whereby to prevent operation of said auxiliary braking system.

**4,516,401**

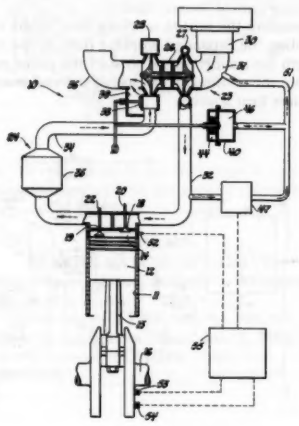
## SUPERCHARGED ENGINE CHARGE CONTROL

**John S. Jackson, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 4, 1983, Ser. No. 548,709**

**Int. Cl.³ F02B 37/12**

**U.S. Cl. 60—602** **2 Claims**



1. An internal combustion engine comprising

at least one variable volume combustion chamber in which compressed charges are cyclically burned and expanded to produce power, whereby a cyclical peak pressure is reached at a measurable interval after each charge is compressed to its minimum volume,

a charge supply system connected to deliver charges to the combustion chamber for compression and burning, the charging pressure in said supply system being functionally related to said peak pressure interval,

a supercharger for increasing the charge pressure in said charge supply system, thereby altering said peak pressure interval,

means for detecting said peak pressure interval and measuring the deviation of said interval from a reference value, and

valve means coupled with said means for detecting said peak pressure interval for altering said charge pressure in a direction to minimize the deviation of said interval from said reference value and thereby desirably affect engine operation.

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**4,516,402**

## LIMITLESS AND LIMITED HEAT SOURCES POWER PLANTS

**Yan P. Chang, 181 Sherbrooke Ave., Williamsville, N.Y. 14221**

**Continuation-in-part of Ser. No. 406,321, Aug. 9, 1982, abandoned. This application May 31, 1983, Ser. No. 499,286**

**Int. Cl.³ F01K 13/02**

**U.S. Cl. 60—656** **8 Claims**

1. A method of utilizing the thermal energy of a substantially limitless heat source, which is usually considered as an inert heat source such as the atmosphere and the like, and of a limited heat source, such as the combustion of fossil fuel, to power a plant including (i) first heat exchange means operatively associated with the sources, (ii) a prime mover which includes a gas turbine and a compressor, operates in a closed cycle and is operatively associated with the first heat exchange means, (iii) second heat exchange means operatively associated with the prime mover and (iv) an auxiliary system for starting the operation of the prime mover; the said method comprising:

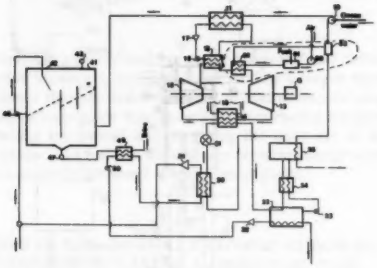
(a) selecting the proper first and second heat exchange

means to provide appropriate heating and cooling processes of the power cycle so that the power plant is capable of producing net work with the continuous increase of entropy in the surroundings.

(b) passing the source fluid from such heat sources through the said first heat exchange means wherein the source fluid gives heat to the working fluid of the turbine and is cooled as it flows out of the first heat exchange means to produce cooled source fluid;

(c) expanding the heated working fluid in the turbine:

(d) cooling the expanded working fluid by the said auxiliary system for a short period to start the prime mover and to initiate the continuous release of thermal energy from the limitless heat source;



(e) cutting off the auxiliary system;

(f) conducting a portion of the cooled source fluid effluent from the first heat exchange means to the said second heat exchange means wherein the heat of the expanded working fluid is removed and discharged to the cooled source fluid;

(g) compressing the cooled expanded working fluid back to the said first heat exchange means wherein the compressed working fluid is heated by the source fluid to repeat steps (b), (c), (f) and (g); and

(h) utilizing the remaining cooled source effluent from such power plant for another cooling process.

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**4,516,403**

## WASTE HEAT RECOVERY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

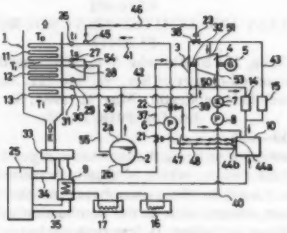
**Yoshiharu Tanaka, Machida, Japan, assignor to Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan**

**Filed Apr. 20, 1984, Ser. No. 602,563**

**Claims priority, application Japan, Oct. 21, 1983, 58-196200**

**Int. Cl.³ F22D *5/00***

**U.S. Cl. 60—667** **3 Claims**



1. In a waste heat recovery system comprising

(a) an exhaust gas economizer having a preheating portion, an evaporating portion and superheating portion, (b) a multi-pressure steam turbine driving generator, (c) a steam separating drum and a first steam line supplying steam within the steam separating drum to a high pressure portion through the superheating portion of the exhaust gas economizer, said waste heat recovery system comprises:

(c) a steam separating drum and a first steam line supplying steam within the steam separating drum to a high pressure inlet of said multi-pressure steam turbine through the superheating portion of the exhaust gas economizer;

(d) a hot water flash turbine connected to said multi-pressure steam turbine;

(e) a hot water supply line supplying hot water in the steam separating drum to said hot water flash turbine;

(f) a second steam line supplying steam separated in said hot water flash turbine to a low pressure inlet of the multi-pressure steam turbine;

(g) a first return line returning the hot water separated in said hot water flash turbine to a drain tank;

(h) a second return line returning water condensed from the exhaust steam discharged from said multi-pressure steam turbine to said drain tank through a variety of coolers;

(i) a water supply line supplying the liquid in said drain tank to the preheating portion of the exhaust gas economizer;

(j) a first control valve provided at said second steam line and controlling a supply of the steam within the second steam line by sensing the temperature of circulating water at the inlet side of the preheating portion of the exhaust gas economizer;

(k) a feed water supply pump provided at said water supply line;

(l) a second control valve provided at said water supply line and controlling a supply of the water by sensing a water level in the drain tank; and

(m) a third control valve provided at said hot water supply line and controlling a supply of the hot water by sensing the water level in the drain tank.

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**4,516,404**

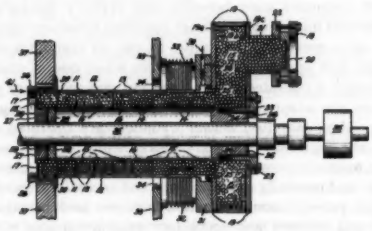
## FOAM FILLED INSERT FOR HORIZONTAL CRYOSTAT PENETRATIONS

**Evangelos T. Laskaris, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Mar. 30, 1984, Ser. No. 595,201**

**Int. Cl.³ F17C *1/00***

**U.S. Cl. 62—45** **24 Claims**



1. An insert for horizontal cryostat penetration comprising:

an outer, low thermal conductivity tube;

an inner, low thermal conductivity tube disposed substantially coaxially with respect to said outer tube;

a plurality of foam pieces disposed between said inner and outer tubes;

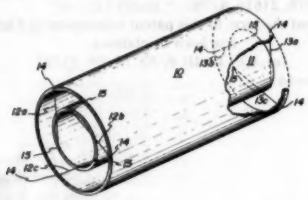
an annular chamber sealably affixed to said inner and outer tubes so that the interior volume of said chamber is in flow communication with the volume between said inner and outer tubes containing said foam particles; and

blowout means in flow communication with the interior of said annular chamber.

## 4,516,405
## SUPPORTING TIE CONFIGURATION FOR CRYOSTAT FOR COLD SHIPMENT OF NMR MAGNET

**Evangelos T. Laskaris, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Jun. 15, 1984, Ser. No. 621,321**
**Int. Cl.³ F17C *7/02***
**U.S. Cl. 62—55** **5 Claims**



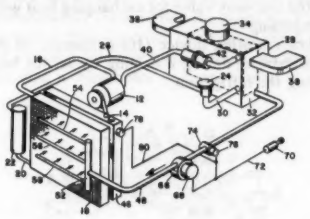
1. A cryostat comprising:
an outer, evacuable vessel having an annular shape;
an interior vessel having an annular shape and being wholly contained within said outer vessel so that the central axes of said interior vessel and said outer vessel lie substantially along the same line;
a first set of at least three supporting ties extending transversely from attachment positions on a first end of said interior vessel to corresponding attachment points on the proximal end of said outer vessel, said attachment points on said first end of said interior vessel being substantially uniformly disposed about the periphery thereof and said corresponding attachment points on said outer vessel being substantially uniformly disposed about said outer vessel; and
a second set of at least three supporting ties extending transversely from attachment points on a second end of said interior vessel to corresponding attachment points on the proximal end of said outer vessel, said attachment points on said second end of said interior vessel being substantially uniformly disposed about the periphery thereof and said corresponding attachment points on said outer vessel being substantially uniformly disposed about said outer vessel;
said first and second set of said supporting ties each being disposed so that the angle $\theta$ between said tie and a line drawn from its attachment point on said interior vessel to said axis is given by $\theta=\cos^{-1}(\Delta t/\Delta R)$, where $\Delta t$ is the thermal contraction length of said tie and $\Delta R$ is the thermal radial contraction length of said interior vessel.

## 4,516,406
## COOLING SYSTEM FOR MOTOR VEHICLES

**Samuel H. Gentry, Chula Vista, Calif., and Frank Gentry, Rogersville, Tenn., assignors to Gentry and Green Enterprises, San Diego, Calif.**

**Filed Feb. 22, 1983, Ser. No. 468,077**
**Int. Cl.³ F25B *39/04***
**U.S. Cl. 62—183** **18 Claims**

1. A cooling system for a motor vehicle having an engine and also having an air conditioner that includes an evaporator in a plenum chamber and a condenser, comprising:
conduit means connected at one end with said plenum chamber;
cooled air dispersing means connected to the other end of said conduit means adjacent said condenser for automatically, selectively passing a portion of the cooled air from said plenum chamber over said condenser; and
means responsive to the engine temperature for controlling the amount of cooled air passing from said plenum chamber to said cooled air dispersing means, the amount of cooled air flowing through said conduit means selectively ranging from zero to the capacity of said conduit means, based on demand;

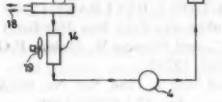


whereby the refrigerant in the condenser is cooled, thereby reducing the tendency of the vehicle engine to overheat.

## 4,516,407
## REFRIGERATING APPARATUS

**Shin Watabe, Nagoya, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Japan**

**Filed May 27, 1983, Ser. No. 498,962**
**Claims priority, application Japan, Jun. 3, 1982, 57-95248**
**Int. Cl.³ F25B *27/02***
**U.S. Cl. 62—238.6** **7 Claims**



1. A refrigerating apparatus comprising, a compressor, a condenser having an inlet and an outlet, an expansion valve, and an evaporator all connected in series, an upstream air cooled condenser adjacent said condenser having an inlet and an outlet, said upstream air cooled condenser inlet being connected to said compressor, a downstream air cooled condenser adjacent said expansion valve having an inlet and an outlet with said outlet of said downstream air cooled condenser being connected to said inlet of said expansion valve, a water cooled condenser having an inlet and an outlet and being connected between both of said upstream and downstream air cooled condensers, said inlet of said water cooled condenser being connected to said outlet of said upstream air cooled condenser and said outlet of said water cooled condenser being connected to said inlet of said downstream air cooled condenser.

## 4,516,408
## REFRIGERATION SYSTEM FOR REFRIGERANT HEATING TYPE AIR CONDITIONING APPARATUS

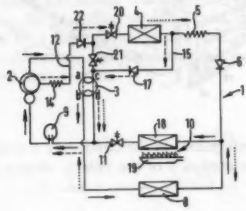
**Mitsuyoshi Chiba, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Apr. 30, 1984, Ser. No. 605,078**
**Claims priority, application Japan, May 25, 1983, 58-90626**
**Int. Cl.³ F25B *27/02***
**U.S. Cl. 62—238.7** **14 Claims**

1. A refrigeration system for a refrigerant heating type air conditioning apparatus having a main circuit including a compressor for circulating refrigerant, a four-way valve connected to the high pressure side of the compressor for changing the direction of flow of the refrigerant, an outdoor heat exchanger (4) connected for receiving the refrigerant through the four-way valve and condensing the refrigerant, a main capillary

tube connected to receive the condensed refrigerant, a check valve connected to receive refrigerant from the capillary tube, and an indoor heat exchanger (8) provided between the check valve and the four-way valve for exchanging heat with air, said system comprising:

a refrigerant heating device (10) connected to the indoor heat exchanger during a heating cycle, for heating and vaporing the refrigerant;



a releasing circuit connected to the outlet side of the compressor, for bypassing a portion of refrigerant toward the four-way valve;

valve means for changing the refrigerant flow direction from the releasing circuit toward the outdoor heat exchanger or the four-way valve; and

means for removing the refrigerant from the outdoor heat exchanger according to the flow direction of said refrigerant.

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**4,516,409**

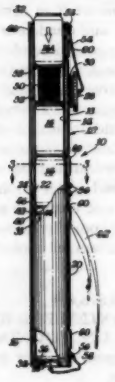
## PORTABLE BEVERAGE COOLER

**Andrew G. P. Hobbs, Jr., P.O. Box 240; Brett D. Lickle, "The Yellow House" , and Patricia W. Hobbs, P.O. Box 240, all of Montchanin, Del. 19710**

**Filed May 1, 1984, Ser. No. 605,919**

**Int. Cl.³ F25D** *3/08*

**U.S. Cl. 62—457** **14 Claims**



1. A portable beverage cooler comprising a tubular container having an internal storage passageway therein open at its opposite ends and arranged to receive a plurality of beverage cans in end-to-end relationship, removable caps at the ends of the container closing the ends of the storage passageway, spring means in the storage passageway biased against beverage cans to assist in removing them from the cooler when one or the other of the end caps is removed and bearing means on opposite ends of the spring means constructed and arranged to engage beverage cans as such cans are introduced into the cooler and removed therefrom.

**4,516,410**

## KNITWORK DRAWING DEVICE IN A DOUBLE CYLINDER CIRCULAR KNITTING MACHINE

**Francesco Lonati, Brescia, Italy, assignor to Lonati S.p.A., Brescia, Italy**

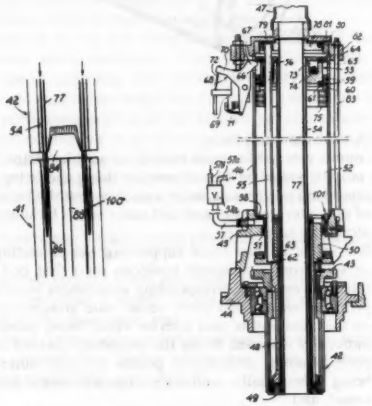
**Continuation of Ser. No. 923,416, Jul. 10, 1978, Pat. No. 4,407,145. This application Feb. 4, 1983, Ser. No. 463,792**

**Claims priority, application Italy, Jul. 14, 1977, 25773 A/77; Mar. 24, 1978, 21614 A/78**

**The portion of the term of this patent subsequent to Oct. 4, 2000, has been disclaimed.**

**Int. Cl.³ D04B** *9/10, 15/88, 15/92*

**U.S. Cl. 66—14** **5 Claims**



1. In a circular knitting machine having an upper and a lower needle cylinder defining a stitch-formation area therebetween, and needles in said upper and lower needle cylinder, a knitwork drawing device comprising a cylindrical chamber coaxial with said upper and lower needle cylinder, a fluid-operated piston slidable within said cylindrical chamber, a hollow rod secured to said piston and extending at least partially within one of said needle cylinders, said rod having open ends, knitwork retaining means arranged at said stitch-formation area, said knitwork retaining means having a cross dimension smaller than said hollow piston rod and being rotatable with the knitwork, means for delivering pressure fluid into said cylindrical chamber to operate said piston and for discharging pressure fluid therefrom, wherein said knitwork retaining means comprise an elongated tubular member arranged inside said hollow rod and spaced therefrom and having two open ends, and a locking member coaxial with said hollow rod and said elongated open-ended tubular member and facing said elongated open-ended tubular member at said stitch-formation area, one of said members being axially movable with respect to the other to lock the knitwork therebetween and within said elongated open-ended tubular member and to subsequently release the knitwork thereby knitwork portions lying along a whole length of the knitwork between an initially knitted portion and a finally knitted portion being selectively lockable between said elongated open-ended tubular member and said locking member and the knitwork entering one of said two ends of said elongated open-ended tubular member being dischargeable through another of said two ends of said elongated open-ended tubular member, and wherein said hollow rod is movable past said stitch-formation area to engage and tension the knitwork which is being knitted by said needles and locked by said locking member and said elongated open-ended tubular member.

## 4,516,411
## LOOP HOLD-DOWN DEVICE FOR USE IN CONJUNCTION WITH A KNITTING MACHINE

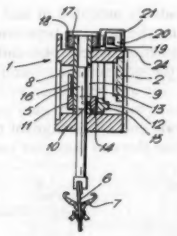
**Jack T. Hampson, Belper, England, assignor to J & P Coats, Limited, Glasgow, Scotland**

**Filed Dec. 9, 1983, Ser. No. 559,759**

**Claims priority, application United Kingdom, Dec. 9, 1982, 8235148**

**Int. Cl.³ D04B** *7/04*

**U.S. Cl. 66—64** **8 Claims**



1. A loop hold-down device incorporating a carrier member attachable to the needle actuating carriage customarily forming part of a flat knitting machine and movable to and fro along the needle bed of the machine, two spaced parallel rods rotatable about their axes and also reciprocable in the carrier member in a direction which is vertical when the carrier member is attached to said movable carriage and a loop hold-down element attached to and projecting from the lowermost end of each rod, i.e. the end which is lowermost when the device is attached to the carriage in which two sleeves are mounted in the carriage to be rotatable but restrained against reciprocation in the carrier, each rod is slidable in a respective sleeve and is entrained by the sleeve to rotate therewith, a driving band interconnects the two sleeves whereby to cause both sleeves to rotate together, two sliding blocks are slidable vertically in the carrier member, each block engaging a respective rod and each formed with a cam follower engageable with a cam surface located at each end of the bed of the knitting machine and thereupon to be operable to cause the associated rod to reciprocate in the sleeve and an actuating bar slidable in the carrier member in a direction parallel with the direction in which the carriage is movable, said actuating bar being connected to the driving band and being engageable with an abutment located at each end of the knitting machine as the carriage moves to and fro so that the bar is also movable to and fro in the carrier member, moving with it the driving band.

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## 4,516,412
## CAMBOX FOR A FLAT KNITTING MACHINE

**Karl Essig, Gaienhofen, Fed. Rep. of Germany, assignor to H. Stoll GmbH & Co., Reutlingen, Fed. Rep. of Germany**

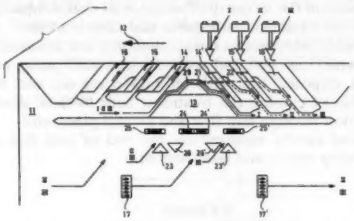
**Filed Sep. 30, 1982, Ser. No. 429,197**

**Claims priority, application Fed. Rep. of Germany, Nov. 1, 1981, 3144246**

**Int. Cl.³ D04B** *7/00*

**U.S. Cl. 66—78** **2 Claims**

1. A cambox for a flat knitting machine adapted to produce single needle bed, multicolor knitting patterns during a single pass of the machine carriage characterized by the provision of a plurality of stitch cams operable independently of one another and associated together at the two sides of the cambox and control means for providing independent movement of said stitch cams and of selected needles carrying yarns of at least three different colors such that needles carrying a first color yarn are caused to travel through a needle guide track of the cambox and to be drawn down by a first stitch cam to provide a knitted stitch of the first color, such that needles carrying a second color yarn are caused to travel through the needle guide track along a second path in which the needles are held out of the guide track of the cambox at a first point corresponding to the point of which the needles carrying the first color yarn are drawn down by the first stitch cam and thereafter are subsequently released into the guide track of the cambox so as to enable drawing down of a knitted stitch of the second color by a second, laterally spaced stitch cam, and such that needles carrying a third color yarn are caused to travel



along a third path wherein the needles are held out of the needle guide track at said first point and at a further point corresponding to the point at which the needles carrying the second color yarn are released, and thereafter are subsequently released into the guide track of the cambox so as to enable drawing down of a knitted stitch of the third color by a third stitch cam spaced laterally from said second stitch cam.

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## 4,516,413
## MACHINES FOR THE LIQUID OR GASEOUS TREATMENT OF TEXTILE MATERIAL OR OTHER FIBROUS OR POROUS MATERIALS

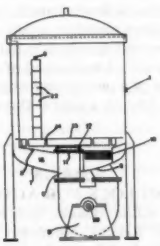
**Robert Barriquand; Bernard Barriquand; Bernard Durantet, and Bernard Machabert, all of Roanne, France, assignors to Barriquand, Roanne, France**

**Continuation of Ser. No. 349,997, Feb. 18, 1982, abandoned. This application Sep. 7, 1984, Ser. No. 648,352**

**Claims priority, application France, Mar. 5, 1981, 81 04401**

**Int. Cl.³ D06B** *5/18*

**U.S. Cl. 68—5 C** **20 Claims**



1. A machine for treating textile materials or other fibrous or porous materials with a liquid or gaseous treatment bath, and more particularly for washing, dyeing and bleaching such material, said machine comprising:

a container;

a false bottom disposed in, and extending across a lower part of, said container;

a first pipe mounted in said container and being vertically disposed, one end of said pipe extending through the bottom of said container and said false bottom;

a second pipe mounted in said container and extending through the bottom of said container and said false bottom;

said false bottom being imperforate except for first and

second openings for receiving said first and second pipes, respectively;

said false bottom defining in combination with the bottom of said container a compartment which is fluid-tight with respect to said treatment bath in the container above said false bottom, said false bottom further defining means for reducing the volume of bath circulating within said container;

said first and second pipes being sealed in said false bottom to maintain the integrity of isolation of said compartment from the treatment bath above said false bottom;

a reversible pump means interconnecting, and communicating with, said first and second pipes, said pump means being disposed externally of said container and being capable of causing the treatment bath to flow in either direction through said first and second pipes; and

a material carrier mounted on the end of said first pipe extending above said false bottom.

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**4,516,414**

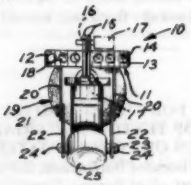
## SECURITY LOCKING DEVICE FOR OUTDOOR WATER FAUCETS

**Samuel C. Woolvin, 350 Jackson Pl., Corpus Christi, Tex. 78411**

**Filed Apr. 5, 1983, Ser. No. 482,183**

**Int. Cl.³ B65D** *55/14*

**U.S. Cl. 70—164** **1 Claim**



1. A security locking device for outdoor water faucets, comprising, in combination, a circular main body comprised of two semi-circular body halves, projecting hasps on each end of each said half, an opening in each said hasp, said openings at each end being aligned with each other when said halves encompass and enclose a faucet handle, for receiving a padlock and locking said halves together, a pair of links, each said link being affixed at one end to one said half and its opposite end being pivotally connected to one end of a link arm which at its opposite end to one of a pair of oppositely extending lugs on a cap, and said cap having a screw thread for screwing on a faucet spout.

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**4,516,415**

## STEERING LOCK FOR AUTOMOBILES

**Satoru Kobayashi; Mikio Masaki, both of Kawaguchi; Hideaki Sakuno, Tokyo; Keiichi Shimizu, Tokyo, and Takeshi Fukasawa, Tokyo, all of Japan, assignors to Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 30, 1982, Ser. No. 403,318**

**Claims priority, application Japan, Dec. 26, 1981, 56-209528**

**Int. Cl.³ B60R** *25/02;* **F16C** *3/00;* **G05G** *5/00*

**U.S. Cl. 70—252** **3 Claims**

1. A steering lock for an automobile, actuated by a key to engage a steering shaft, said steering lock comprising:

a frame;

a housing disposed in said frame, said housing defining a cam groove and a locking cam groove;

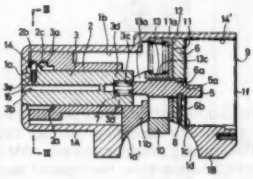
a partition defined by the housing separating the cam groove and the locking step cam groove;

a key cylinder rotatably mounted in said housing for rotation about its axis and for axial movement within said housing, said key cylinder defining a key insertion slot and a radial bore, said key insertion slot extending axially in said key cylinder and said radial bore communicating with said key insertion slot;

locking rod means movably supported in said frame, said locking rod means being movable between a retracted position wherein the locking rod means is disengaged from the steering shaft and a locking position wherein the locking rod means is located in locking engagement with the steering shaft, said key cylinder including a cam portion engaging said locking rod means;

a first spring biasing said key cylinder away from said locking rod means;

a control member slidably mounted in said radial bore and sliding axially along the housing between three positions including a first position where one end of the control member contacts the side surface of said key inserted in the key insertion slot and the other end of the control member engages said locking step cam groove, a second position wherein one end of the control member extends into the key insertion slot and the other end of the control



member engages the partition upon the withdrawal of the key from the key insertion slot, and a third position wherein one end of the control member engages said cam groove and the other end of the control member extends to the key insertion slot;

a second spring biasing said control member radially away from said key insertion slot, the bias of said first spring being greater than the bias of said second spring;

said key cylinder being axially movable in a first direction by rotation of the key in said key insertion slot to move said control member from said cam groove to said locking step cam groove until said cam portion of the key cylinder moves said locking rod means to said retracted position; and

said key cylinder being axially movable in a second direction opposite to said first direction by said first spring upon removal of the key from said key insertion slot to move said control member from said first position to said second position and said third position.

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**4,516,416**

## LOCKING DEVICE AND KEY

**Kurt Prunbauer, Herzogenburg, and Erich Csapo, Vienna, both of Austria, assignors to Evva-Werk Spezialerzeugung von Zylinder- und Sicherheitsschlössern Gesellschaft m.b.H. & Co. Kommanditgesellschaft, Vienna, Austria**

**Continuation of Ser. No. 232,244, Feb., 1981, abandoned. This application Jan. 20, 1984, Ser. No. 572,952**

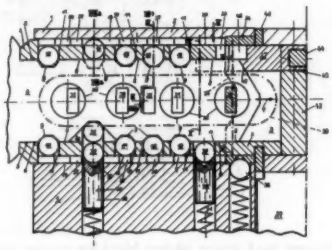
**Claims priority, application Austria, Feb. 8, 1980, 701/80; Feb. 14, 1980, 811/80; Mar. 3, 1980, 1167/80**

**Int. Cl.³ E05B** *27/06, 47/00*

**U.S. Cl. 70—276** **19 Claims**

1. Closure device with a cylinder core turnable in a housing and a key insertable into a key channel, wherein the key has opposite longitudinal edges formed with recesses extending transversely to the direction of insertion and delimiting edge portions therebetween, which edge portions and recesses control blocking elements shiftable transversely to the direction of insertion of the key and which blocking elements extend in the locking position into a recess of the housing and in the unlocking position are arranged within the plane of separation between the cylinder core and the housing, the blocking elements

being balls guided in bores of the cylinder core, the arrangement of at least one blocking element in the cylinder core corresponding to the arrangement of a recess on the key, the arrangement of at least one ball in the cylinder core corresponding to the arrangement of an edge portion on the key, said one ball being in a circumferential groove on the inner surface of the housing permitting a turning of the cylinder core, a key-holding multipartite pin arranged in the same plane as said one ball at the opposite longitudinal edge of the key, the division of said pin being located in the plane of separation between the cylinder core and the housing, said pin having a



housing pin portion which slides under the pressure of a spring after a turning of the key through 180° over the ball held in the groove by the edge portion, or which enters into the bore of said one ball and blocks the cylinder core if a wrong key is inserted, and further including another ball guided in another bore of the cylinder core and cooperating with another edge portion and being pressed by a housing pin and spring thereof against the other edge portion, said another ball being guided in another circumferential groove of the housing and the cylinder core surface being essentially continuous at a side opposite said another bore.

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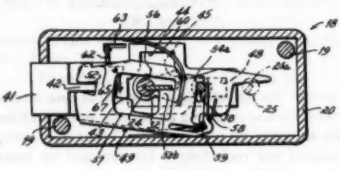
**4,516,417**

## CHANGEABLE KEYLOCK HAVING TUMBLERS WITH SHIFTABLE PIVOT SEATS

**Joseph J. Parrock, Milford, Ohio, assignor to American Standard Inc., New York, N.Y.**

**Filed Dec. 13, 1982, Ser. No. 449,378**
**Int. Cl.³ E05B *25/00***
**U.S. Cl. 70—384** **17 Claims**



1. In a key changeable lock wherein at least one lever tumbler is turned about a pivot in a lock case by an operating key into a rotational position of alignment to permit a bolt to be withdrawn, the improvement wherein,

said pivot is fixedly secured against movement in the lock case,

said tumbler presents a series of seats in the form of notches, the notches being alternatively engageable with said pivot,

spring means exerting a biasing force from a fixed surface in the lock to said tumbler and tending to move the tumbler toward said pivot to maintain a particular one of said seats in rotational engagement with said pivot, and

said tumbler is movable by a change key which bears directly on the tumbler to move it so that said seats are shifted in a direction tangential to said pivot, against the bias of said spring means, thereby to disengage one of said seats from said pivot and engage another seat therewith, the rotational axis of the tumbler thereby being changed so that the rotational position of alignment of the tumbler is also changed.

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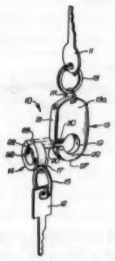
**4,516,418**

## SEPARABLE HOLDER FOR KEYS AND THE LIKE

**Luis Cuttler, Mexico City, Mexico, assignor to FAOSA - Fabrica de Armazones Opticos, S.A., Mexico City, Mexico**

**Filed Sep. 29, 1982, Ser. No. 427,554**
**Int. Cl.³ A47G *29/10***
**U.S. Cl. 70—456 R** **7 Claims**



1. A separable holder for keys and the like, comprising:

a first body having a first hole therein, one end portion on one side of said hole for connection to keys and the like, a second end portion on the opposite side of said hole in the form of a rib defining one side of said hole, and a passage having a finger defining one side of said passage and having a V-shaped end, said passage substantially narrower than the width of said hole extending from said hole to another side of said body;

a second body having a second hole therein surrounded by an at least substantially continuous wall that is thicker than said passage and thin enough to fit loosely in said first hole, said second hole being larger than the thickness of said rib to receive the latter in said second body, and said wall having a single notch creating a portion of reduced thickness that is sized and shaped to slide through said passage with a close fit, thereby to couple said bodies detachably together the angle of said notch being smaller than the angle of said V-shaped end and the passage being sized to permit the ring to slide through the passage with an interference fit along two lines, to reduce the possibility of inadvertent uncoupling and for avoiding jamming flat surface contact;

and first and second means for holding keys and the like, said first means being connected to said one end portion of said first body, and said second means being pivotally connected to said second body at a point other than directly opposite said portion of reduced thickness, thereby to tend to position that portion away from said passage.

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**4,516,419**

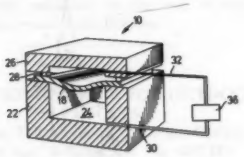
## METHODS OF ENHANCING SUPERPLASTIC FORMABILITY OF ALUMINUM ALLOYS BY ALLEVIATING CAVITATION

**Suphal P. Agrawal, Rancho Palos Verdes, Calif., assignor to Northrop Corporation, Hawthorne, Calif.**

**Filed Dec. 28, 1981, Ser. No. 335,264**
**Int. Cl.³ B21D *26/04***
**U.S. Cl. 72—60** **4 Claims**

1. Improvements in a method of superplastically forming a component by deformation comprising the steps of:

providing a blank of material having superplastic characteristics to be deformed into the component;
providing a die having a cavity surface which is complementary to the shape of the component, and having fluid ports;
providing a die opposing cover having fluid ports;
providing a fluid supply for introducing fluid under pressure controllably through said fluid ports of said die and said cover;
positioning said blank between said die and said cover;
bringing said blank to a temperature at which said blank exhibits superplastic characteristics;
applying to the blank a first fluid pressure on the cavity side thereof; and
simultaneously applying to said blank a second fluid pressure to the cover side thereof;
the improvement comprising




controlling said first and second fluid pressures as applied to said blank during a forming cycle to generate opposing forces to apply initially a very low or substantially nil pressure differential causing compressive force to opposing sides of said blank and then to reduce the cavity side pressure to permit said blank to be forced toward engagement with said die, and thereafter varying said cavity side pressure as a function of time while maintaining constant the cover side pressure in order to create a net differential pressure in accordance with the predetermined pressure-time requirements as necessary to form the blank into the said component shape, and reducing said pressures at substantially the same rate or reducing said cavity side pressure at a rate slightly lower than the rate of decrease of the cover side pressure whereby the differential pressure reduces gradually until said pressures are eliminated and said blank is caused to fully engage said die.

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**4,516,420**

## SHELL TOOLING

**Joseph D. Bulso, Jr., Canton; Stephen D. Doyle, and James A. McClung, both of North Canton, all of Ohio, assignors to Redicon Corporation, Akron, Ohio**

**Filed Jun. 10, 1983, Ser. No. 503,343**
**Int. Cl.³ B21D *28/02, 28/14***
**U.S. Cl. 72—329** **7 Claims**

1. Apparatus for forming an end panel from a blank of metal in a double acting press having inner and outer slides and a lower platen, comprising:

(A) fluid actuated pressure means, carried by the outer slide of the press and being movable into holding engagement with the metal;

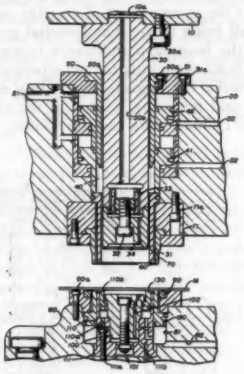
(B) blanking means carried by the outer slide of the press and the fixed lower platen thereof;

(C) forming means carried by the inner slide of the press for forming the panel;

(D) die means carried by the lower platen for initially forming a chuck wall of the panel in cooperation with said blanking means and said forming means;

(E) cushioning means carried by the lower platen and resiliently supporting the panel in the chuck wall area against the force of the forming means during final formation of the chuck wall;

(F) said die means including a die core fixed to said lower platen and a die core ring carried by said lower platen in encircling relationship with said die core, said blanking means on said lower platen encircling said die core ring and being spaced therefrom so that said outer slide blanking means telescopically moves over said die core ring



between said lower platen blanking means and die core ring to initially form said chuck wall; and

(G) said cushioning means including a piston between said die core and said die core ring.

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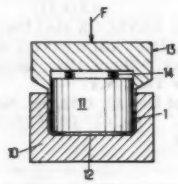
**4,516,421**

## DEVICES FOR MANUFACTURING ANNULAR FRAMES FOR SEALS AND TO THE CORRESPONDING FRAMES AND SEALS

**Gérard Tavin, Segre, France, assignor to Hutchinson, Paris, France**

**Filed Sep. 13, 1982, Ser. No. 417,337**
**Int. Cl.³ B21D *22/00***
**U.S. Cl. 72—354** **2 Claims**




1. A device for deforming a cylindrical ring into an annular metal frame for a seal having an annular portion at one end and a radially directed lip portion at the other end, comprising:

an external pot including a bottom and an inner annular surface defining a cylindrical cavity,

a central mandrel located inside of said cavity, said mandrel being cylindrically shaped to mate with the bottom of the pot to define a radially directed cavity and arranged so that the outer surface of the mandrel defines with the inner annular surface of the pot an annular cavity of small thickness adapted to jointingly receive and axially guide the ring during deformation thereof, and

a bell-shaped punch having a thin cylindrical skirt dimensioned and mounted to slide axially and jointingly into the entrance of said annular cavity, the radial cross section of said skirt having the shape of a ring identical to the radial cross section of the edge of the ring to be driven, said skirt comprising means for engaging the edge of the ring to drive the opposite end of the ring down into the radially directed cavity upon downward movement of the punch

and skirt to form the radially directed portion of the metal frame.

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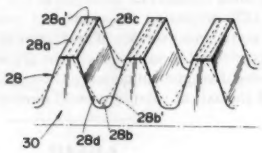
**4,516,422**

## METHOD OF MANUFACTURING RACKS FOR VARIABLE RATIO STEERING GEARS

**Kunihiko Morikawa, Yokosuka; Megumu Higuchi, Tokyo, and Tokiyoshi Yanai, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jun. 15, 1983, Ser. No. 504,402**
**Claims priority, application Japan, Jul. 7, 1982, 57-116997**
**Int. Cl.³ B21D *31/00***
**U.S. Cl. 72—377** **3 Claims**




1. A method of manufacturing a rack for a variable ratio rack and pinion steering gear, comprising:

a preforming process for preparing a rack blank having a plurality of teeth which are formed to a shape corresponding approximately to the shape desired in the finished rack said preforming process including forming top lands of said preformed rack teeth to be level with those in the finished shape, forming bottom lands of said preformed rack teeth to be deeper than those in the finished shape, forming the widths of the preformed teeth such that the preformed teeth are all wider at the top areas than in the finished shape, and forming the ratio of the widths at the root areas of the rack teeth in the preformed shape to those in the finished shape in proportion to the variation of the steering ratio such that a rack tooth for a higher steering ratio has a higher width ratio; and

a finishing process comprising converting the teeth to a finished shape by cold forming the rack blank in a die having a shape corresponding to a counterpart of the finished shape.

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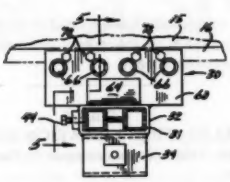
**4,516,423**

## VEHICLE FRAME CLAMPING AND SUPPORT APPARATUS

**George Reich, Elgin, Ill., assignor to Unibody Time Saver Corporation, Elgin, Ill.**

**Filed Feb. 11, 1983, Ser. No. 465,450**
**Int. Cl.³ B21D *1/14***
**U.S. Cl. 72—422** **23 Claims**



1. A motor vehicle frame support apparatus for use in straightening of vehicle bodies and frames comprising base means, a plurality of frame engaging clamping heads, means for selectively mounting said clamping heads on said base means in determined location with respect to a vehicle frame to be straightened, said clamping heads each including a pair of relatively movable jaw supports each carrying a clamping jaw, means biasing said jaw supports in an outwardly open position for receiving a respective section of said vehicle frame between said clamping jaws, means associated with each clamping head for selectively causing relative transverse movement of the jaw supports against the force of said biasing means for engaging said vehicle frame between the jaws, said jaw supports of each clamping head having opposed faces and means interposed between said faces for maintaining a spacial separation between said jaw supports during clamping, said jaw support separation means comprising a cylindrical rod fixed to the face of one of the jaw supports of each clamping head and the face of the other of said jaw support being recessed to receive said rod during clamping, and floating mounting means for supporting said jaws on said supports for limited pivotal movement relative to said supports during clamping for enhancing reliable engagement of the jaws with the vehicle frame.

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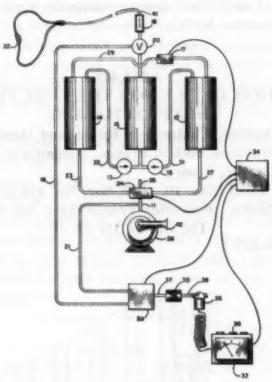
**4,516,424**

## OXYGEN CONCENTRATOR MONITOR AND REGULATION ASSEMBLY

**Robert O. Rowland, Hemet, Calif., assignor to Hudson Oxygen Therapy Sales Company, Temecula, Calif.**

**Filed Jul. 9, 1982, Ser. No. 396,705**
**Int. Cl.³ G01N *31/06***
**U.S. Cl. 73—23** **29 Claims**



1. In an apparatus for increasing the oxygen concentration of a breathable gaseous mixture to be delivered to a patient, the improvement comprising an oxygen sensing assembly for sensing the concentration of oxygen in said breathable gaseous mixture comprising:

a three-way valve having a first and a second gas inlet and a gas outlet, and means for selectively opening said first and second gas inlets,

a first conduit connected to said first gas inlet for directing said breathable gaseous mixture having increased oxygen concentration thereto,

a second conduit connected to said second gas inlet for directing atmospheric air thereto,

an oxygen sensor,

a third conduit connected between said gas outlet and said oxygen sensor, and

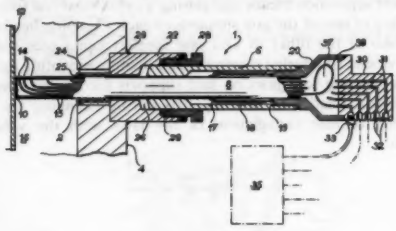
a control means electrically connected to said means for alternately opening one of said first and second gas inlets and closing the other, for a selected time, and operating said oxygen sensor.

**4,516,425**

## DEVICE FOR MEASURING THE SPEED OF THE FLUID IN THE ANNULAR SPACE OF A STEAM GENERATOR

**Christian Chollet, Bois d'Arcy, and Jean David, Champs sur Marne, both of France, assignors to Electricite de France Service National, Paris, France**

**Filed Jun. 14, 1983, Ser. No. 504,067**
**Claims priority, application France, Jun. 16, 1982, 82 10497**
**Int. Cl.³ G01F *15/08***
**U.S. Cl. 73—198** **6 Claims**



**1**. A device for measuring the flow rate of a fluid in an annular space of a steam generator, said space being limited by an inner ferrule and an outer ferrule, said device comprising: a probe housing, means for keeping said housing fixed with respect to the outer ferrule, a probe placed within said housing, an elastic bellows surrounding the probe and having a first end fixed to the probe and another end fixed to said probe housing, said bellows being fitted so as to constantly apply an end of the probe to the inner ferrule.

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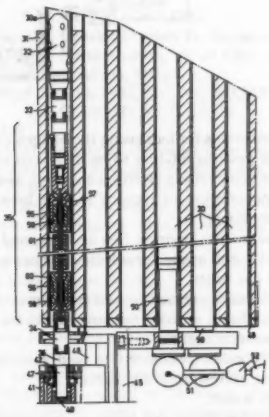
**4,516,426**

## INSPECTION DEVICE FOR THE TUBE PLATE OF A HEAT EXCHANGER

**Pascal G. Dumont, Chatenoy-le-Royal, and Daniel M. Chiron, Chalon-sur-Saone, both of France, assignors to Framatome & Cie, Courbevoie, France**

**Filed Mar. 10, 1983, Ser. No. 474,095**
**Claims priority, application France, Mar. 26, 1982, 82 05170**
**Int. Cl.³ G01N *21/29***
**U.S. Cl. 73—432 R** **4 Claims**



**1**. Inspection device for the tube plate of a heat exchanger upon which a bank of tubes is mounted passing through said plate from its inlet face (**48**) with with said tubes (**30**) are flush to its outlet face through which said tubes (**30**) of said bank emerge, comprising a motive part (**5, 40**) mounted on a support (**41**) equipped with fixing means (**50, 51, 52**) to said inlet face (**48**) and driven in rotation and in translation along the axis of said tubes by driving means fixed to said support (**41**), and an active part (**1, 32**) comprising an inspection probe (**10**) and guide means (**17**) for said probe within said tubes (**30**), the inspection of said tube plate being performed from the inside of each of said tubes (**30**) of said bank successively, wherein said active part (**1, 32**) consists of a central shaft (**8**) rigidly carrying said probe (**10**), and at least one guide sleeve (**14**) for said device mounted rotatably on said central shaft (**8**), about the axis of said shaft (**8**) coincident with the axis of said tube (**30**) into which said active part is introduced, said sleeve (**14**) comprising in its side wall at least two sets, spaced in axial direction, of three orifices (**15**) arranged at 120° and each containing a ball (**17**) projecting outwards and mounted rotatably for rolling on the inner surface of said tube (**30**), said active part (**1**) being connected to said motive part (**5**) by an articulation (**3**) permitting disalignment between the axis of said active part (**1, 32**) and the axis of rotation of said motive part (**5, 40**).

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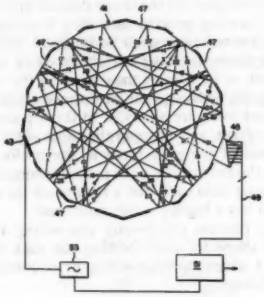
**4,516,427**

## QUARTZ RATE SENSOR

**Desmond F. Carey, Oradell, N.J., assignor to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed May 26, 1983, Ser. No. 498,349**
**Int. Cl.³ G01D *3/44*; G01C *21/00***
**U.S. Cl. 73—505** **20 Claims**



**1**. Sensor for information concerning movement in inertial space characterized by:

(a) a crystalline substance having a plurality of facets;

(b) means, rotationally fixed to said crystalline substance, for transmitting acoustic energy through the crystalline substance such that a substantial amount of the energy occurs along a main beam and the energy in the beam is reflected from the facets until the energy occurs at an output position; and

(c) means, rotationally fixed to said crystalline substance, for detecting a shift in the output position resulting from a deflection of the beam.

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**4,516,428**

## ACCELERATION VIBRATION DETECTOR

**Masao Konomi, Tokyo, Japan, assignor to Pan Communications, Inc., Japan**

**Filed Mar. 31, 1983, Ser. No. 480,723**
**Int. Cl.³ H04R *19/00, 25/02***
**U.S. Cl. 73—585** **19 Claims**

**1**. An electrostatic type acceleration vibration detector mounted within a bone conduction ear microphone adapted to be inserted in the external auditory canal of an ear comprising: a metal casing having a closed end and an open end, said metal casing vibrating in response to physical vibrations con-

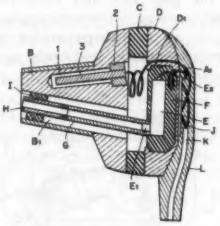
ducted from the surface of the external auditory canal via said ear microphone;

a grounded vibrating electrode in physical contact with said metal casing and near said closed end for vibrating in response to the vibrations of said metal casing;

a transistor positioned between said fixed electrode and said open end;

means for supporting said fixed electrode and said transistor in said metal casing; and

a printed circuit board transverse said metal casing between



said transistor and said open end, said circuit board having conductive patterns on its outer surface, the source and drain terminals of said transistor being connected to individual ones of said conductive patterns, the edge portions of said open end of said metal casing being bent inwardly to contact said outer surface of said circuit board and thereby to apply pressure against said supporting means for mechanically clamping the gate electrode of said transistor in electrical connection with said fixed electrode, the conductive pattern connected with said source electrode being under pressure electrical contact with said edge portions.

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**4,516,429**

## METHOD FOR TESTING THE TOTAL LENGTH OF EXTENDED ROUND MATERIAL SUCH AS PIPES AND BARS, AND DEVICE TO CARRY OUT THE METHOD

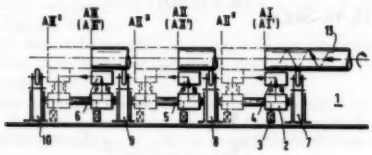
**Harri Haacke, Dusseldorf, and Karl Loch, Duisburg, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany**

**Filed Mar. 4, 1982, Ser. No. 354,664**

**Claims priority, application Fed. Rep. of Germany, Apr. 9, 1981, 3114850**

**Int. Cl.³ G01N *29/04***

**U.S. Cl. 73—638** **1 Claim**



1. A device for testing the total length of extended round material such as pipes and bars moving helically in longitudinal direction, especially with the aid of ultrasonic testing in segment immersion technique, for longitudinal and transverse faults and for wall thickness, comprising:

a plurality of testing heads, independent of each other, positioned along the longitudinal direction of the material; and

driving units connected to each said testing head and moving the associated testing head as a function of the speed of movement of the material, and holding the associated testing head in contact with the forward and rearward end of the material in synchronism with the axial speed of the material at least during one revolution of the material.

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**4,516,430**

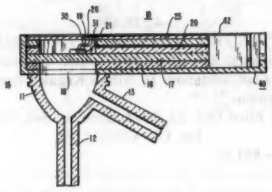
## ECONOMICAL TRANSDUCER APPARATUS FOR USE IN THE MEDICAL FIELD

**Anthony D. Kurtz, Teaneck; Timothy A. Nunn, Ridgewood, and Joseph R. Mallon, Franklin Lakes, all of N.J., assignors to Kulite Semiconductor Products, Inc., Ridgefield, N.J.**

**Filed Dec. 5, 1983, Ser. No. 558,033**

**Int. Cl.³ G01L *1/22***

**U.S. Cl. 73—727** **20 Claims**



1. A pressure transducer apparatus particularly adapted for use in implementing pressure measurements in the medical field comprising:

a planar member fabricated from a highly insulative material and having on a surface a given area adapted to deflect upon application of a force thereto;

a dome member having an opened bottom and a domed surface with a hollow between said opened bottom and said domed surface with said opened bottom coupled about said given area of said planar member, with said dome member having at least one pressure port extending from said domed surface and communicating with said hollow,

a piezoresistive sensor member secured to said planar member and within said given area,

a terminal planar member fabricated from an insulative material and coupled to said planar member, said terminal planar member having an aperture aligned with said active area, and having on a top surface thereof a series of terminal areas, and means coupled said piezoresistive sensor member to said terminal areas on said terminal planar member.

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**4,516,431**

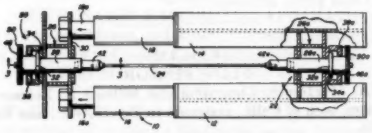
## PIPE TESTING APPARATUS

**William C. Heidenbrand, P.O. Box 2066, New Iberia, La. 70560**

**Filed Jun. 28, 1983, Ser. No. 508,656**

**Int. Cl.³ G01N *3/08***

**U.S. Cl. 73—826** **11 Claims**



1. For a machine used in applying lengthwise tension to a pipe, gripping assemblies for holding the respective pipe ends in respective parts of the machine which are adapted to be urged apart in order to apply tension to the pipe, each gripping assembly including a header means for attachment to the respective part of the machine, a mandrel associated with the header means for attachment to one end of the pipe, abutment means associated with the header means for applying lengthwise force to the mandrel when said parts of the machine are urged apart thereby longitudinally tensioning the pipe, and

restraining means associated with the header means for engaging the mandrel and resisting expulsion of the mandrel from the header means in the event of a pipe failure during the application of lengthwise tension thereto, wherein each mandrel has a peripheral projecting means located between respective shoulders of the associated header means, one of said shoulders constituting said abutment means and being adapted to engage one surface of the projecting means for applying lengthwise force to the mandrel, the other of said shoulders constituting said restraining means and being adapted to engage the opposite surface of the projecting means in the event of a pipe failure under tension, thereby precluding expulsion of the mandrel from the header means.

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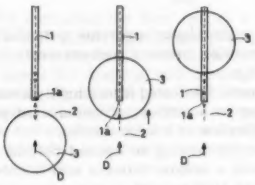
**4,516,432**

## APPARATUS FOR MEASURING TWO-PHASE FLOW

**Katsuji Hironaga, Kawaniasi, and Tadaki Nishiura, Takatsuki, both of Japan, assignors to Nihon Kagaku Kogyo Co., Ltd., Osaka, Japan**

**Filed Oct. 13, 1983, Ser. No. 541,793**
**Int. Cl.³ G01F *1/74***
**U.S. Cl. 73—861.04** **8 Claims**



1. An apparatus for measuring liquid-gas two-phase flow comprising:

a light source for generating light which has a signal oscillation frequency and a specified plane of polarization,

a polarization beam splitter for passing the applied light from said light source,

an optical fiber with two end faces, the light passing through said polarization beam splitter being applied to one of said end faces, and the other end face being placed in said liquid-gas two-phase flow,

a photo detector for receiving reflected light by said polarization beam splitter out of the light reflected by said other end face of said optical fiber for measuring a bubble transit time and the light reflected by a boundary face of said liquid-gas two-phase flow for measuring doppler frequency shift,

a velocity detecting means for detecting bubble velocity from a high frequency component of an output signal of said photo detector, and

a transit time detecting means for detecting bubble transit time from a low frequency component of the output signal of said photo detector.

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**4,516,433**

## FLOW SENSOR

**John A. MacIntosh, Cupertino, and Willard L. Zeigner, San Ramon, both of Calif., assignors to Zemco, Inc., San Ramon, Calif.**

**Filed Jul. 18, 1983, Ser. No. 514,520**
**Int. Cl.³ G01F *1/70***
**U.S. Cl. 73—861.05** **5 Claims**

1. A fluid flow sensor comprising:

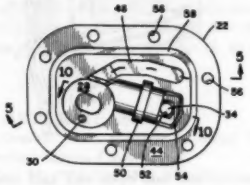
body means having an inlet and an outlet for fluid to be measured;

means forming a continuous raceway within said body means having an inlet passage for receiving a fluid stream to be measured and an outlet passage for discharging the fluid;

a race ball received in the raceway and caused to circulate at a rate in proportion to the flow rate of said fluid stream;

an electromagnetic sensing means adjacent to said raceway for providing an electrical signal with each passage of said race ball; and

nozzle means situated within said inlet passage and having an exit end adjacent said raceway, said nozzle means including means providing a first relatively small passage for said fluid when it flows at a relatively low rate and a second relatively large passage for said fluid when it flows at a relatively high rate, whereby, even at relatively low fluid flow rates, a sufficient force is produced at said exit end to keep the race ball and fluid therein moving smoothly in said raceway; said nozzle means comprising a nozzle having an exterior shape similar to the interior shape of a similar recess in said body means, a nozzle



member seated in said housing having a central bore with an open port at its exit end and cover means attached to its inlet end with a central inlet opening, a plunger in said central bore, and spring means normally urging said plunger against said central inlet opening of said cover means, a relatively small passage extending longitudinally through said plunger and extension means extending from its outer surface, forming a plurality of longitudinal passage having a substantially greater cross-sectional area than said relatively small passage, whereby at low fluid rates said spring holds said plunger against said cover means to that fluid flows through said small passage, and at relatively high flow rates, said plunger moves axially against said spring within said nozzle member so that a greater volume of fluid can flow around said plunger through said longitudinal passages and through the exit end of said nozzle member.

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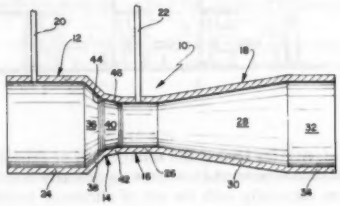
**4,516,434**

## FLOW METERING DEVICE WITH LOW ENERGY LOSS

**Dezsoe Halmi, Cranston, R.I., assignor to D. Halmi And Associates Inc., Pawtucket, R.I.**

**Filed Oct. 20, 1983, Ser. No. 543,954**
**Int. Cl.³ G01F *1/44***
**U.S. Cl. 73—861.64** **7 Claims**



1. A flow metering device of the type operative for producing a pressure differential comprising a shaped tubular member comprising substantially longitudinally extending inlet and throat sections having inlet and throat pressure sensing taps therein, respectively, and a converging section which interconnects said inlet and throat sections, said converging section

comprising an inlet cone portion which extends angularly inwardly in a downstream direction relative to said inlet section and a throat cone portion which extends angularly inwardly in a downstream direction from said inlet cone portion to said throat section, said throat cone portion being at a reduced angle with respect to said inlet section in comparison to said inlet cone portion, the intersections between said inlet cone portion and said throat cone portion and between said throat cone portion and said throat section being of rounded configurations to prevent the formation of vena contractas in fluids passing through said device.

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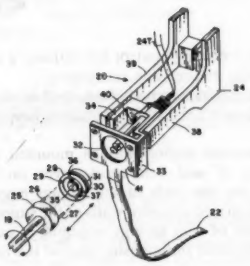
**4,516,435**

## PRECISION MANIPULATOR HEATING AND COOLING APPARATUS FOR USE IN UHV SYSTEMS WITH SAMPLE TRANSFER CAPABILITY

**Ronald A. Outlaw, Newport News, and Bill T. Baugh, Poquoson, both of Va., assignors to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.**

**Filed Oct. 31, 1983, Ser. No. 547,176**
**Int. Cl.³ G01N *1/00, 37/00***
**U.S. Cl. 73—863.11** **6 Claims**



1. A precision manipulator for use in a UHV system with sample transfer capability comprising:

an electrically conductive sample holder;

means for mounting a sample on said sample holder such that heating current will flow from the sample to said sample holder;

first and second manipulator electrodes;

a receiving block electrically connected to said first manipulator electrode and with an opening through it such that said sample holder will fit into the receiving block;

means for attaching said sample holder to said receiving block whenever the sample holder is moved into the receiving block;

a rear electrode assembly including a heater electrode fixed relative to said rear electrode assembly and a thermocouple; and

means for spring loading said thermocouple such that when a pressure is exerted against said thermocouple the thermocouple will move relative to said rear electrode assembly;

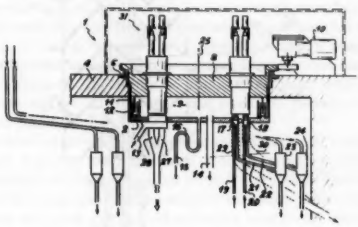
said rear electrode assembly mounted with said heater electrode electrically connected to said second manipulator electrode, said heater electrode and said thermocouple mounted in said rear electrode assembly behind said opening in said receiving block such that when said sample holder is moved into said receiving block said sample comes in contact with said thermocouple first and then as said sample holder is further moved into said receiving block the thermocouple is pushed back against said spring loading means until said sample makes contact with said heater electrode at which time the thermocouple and the heater electrode are both in contact with said sample.

**4,516,436**

## LIQUID SAMPLING BENCH

**Francois Conche, Les Mureaux, and Pierre Naujalis, Orly, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Oct. 20, 1982, Ser. No. 435,353**
**Claims priority, application France, Oct. 26, 1981, 81 20039**
**Int. Cl.³ G01N *1/14***
**U.S. Cl. 73—863.85** **8 Claims**



1. A bench for sampling liquids by means of a container or jug sealed by an elastic plug, which is perforated on a hollow needle connected to a tank containing the liquid to be sampled, the latter being positioned beneath a biological protection slab, wherein said bench comprises a sealed vessel located beneath the protection slab and integral therewith, in which are located the end fittings of the hollow needles, and at least one mechanical device for introducing and manipulating the containers, whereof at least the lower part traverses the slab and terminates in the vessel level with the needle end fittings, the needle end fittings being disposed on two concentric circular arcs, the slab having a rotary plug, whose rotation axis passes through the center of the circular arcs defined by the needle end fittings, the lower part of said at least one mechanical device for introducing and manipulating the containers traversing the rotary plug, said at least one mechanical device comprising at least one tool holder located at a distance from the rotation axis of the plug equal to the radius of one of the circular arcs defined by the hollow needle end fittings, said at least one mechanical device further comprising rotation means for bringing the containers above a needle located on either of the two circular arcs.

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**4,516,437**

## MICROSAMPLE HANDLING APPARATUS

**Raul I. Pedroso, Miami, and Robert S. Coulter, Hialeah, both of Fla., assignors to Coulter Corporation, Hialeah, Fla.**

**Filed Mar. 23, 1983, Ser. No. 478,134**
**Int. Cl.³ G01N *35/06***
**U.S. Cl. 73—864.22** **20 Claims**

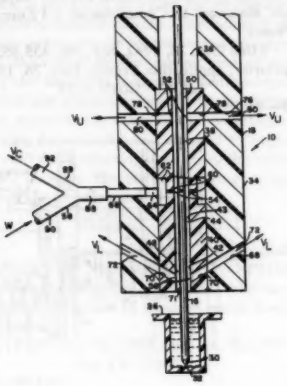
1. A method of cleaning a fluid probe means, having a probe tip, within a cleaning chamber of a cleaning station, said cleaning chamber having a first, open end and a second end, and a plurality of cleaning ports, comprising:

moving said probe means to be cleaned into said cleaning chamber, and

externally:

directing a flow of washing fluid against said probe means while said probe tip extends beyond the open end of said cleaning chamber,

drawing said flow of washing fluid past said probe means, and



drawing a flow of gas from the atmosphere past said probe tip when said probe tip is within said cleaning chamber.

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**4,516,438**

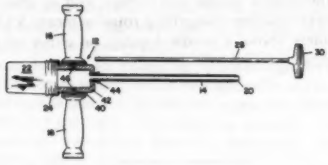
**STANDARDIZED SAMPLING HAY PROBE**

**Allan M. Hodge, 5852 Lomond Dr., San Diego, Calif. 92120**

**Filed Sep. 20, 1983, Ser. No. 534,079**

**Int. Cl.³ G01N *1/08***

**U.S. Cl. 73—864.44** **19 Claims**



1. A hay probe apparatus for obtaining standardized samples of hay for analysis of the actual contents of bales of hay or similar material, comprising:

an elongated hollow metal probe tube, having an inner diameter in the order of one-quarter to five-eighths inch, and a length in the order of eight to sixteen inches, said tube being sharpened at one end;

central mounting assembly secured to the other end of said probe tube;

a pair of handles mounted to said central mounting assembly transverse to said probe;

impermeable container means removably secured to said mounting assembly for receiving hay samples from said probe tube and for maintaining them in substantially the same condition as when the samples were taken from bales of hay; and

tamper rod means for transferring hay samples from said probe tube to said impermeable container;

whereby the samples of a standard volume may be analyzed without significant changes in moisture content or the like between sampling and testing.

**4,516,439**

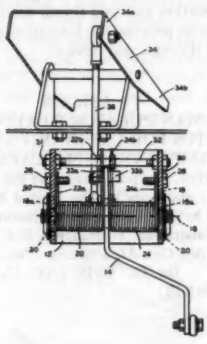
**PUMP CENTERING CONTROL**

**Thomas M. Sagaser, Bismarck, N. Dak., assignor to Clark Equipment Company, Buchanan, Mich.**

**Filed Apr. 6, 1981, Ser. No. 251,439**

**Int. Cl.³ G05G *1/00, 1/14***

**U.S. Cl. 74—470** **7 Claims**



1. A pump centering control for defining a neutral position in a hydrostatic transmission comprising:

a bell crank mechanism including a bell crank lever pivotally mounted on a fixed support bracket having opposite side walls;

first and second torsion springs mounted on the pivotal mounting of said bell crank lever on opposite sides thereof, the one ends of the springs engaging elements mounted on said opposite walls of the support bracket, the other ends of said springs engaging a pair of elements rigidly mounted on opposite sides of the bell crank lever; and

means for moving the bell crank lever in one direction against the bias of one only of the torsion springs and in the opposite direction against the bias of the other only of the torsion springs whereby release of said moving means causes the spring end engaging the element on the bell crank lever to return the bell crank to a neutral position of the pump centering control.

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**4,516,440**

**LOCKING MECHANISM FOR A TELESCOPIC STEERING WHEEL**

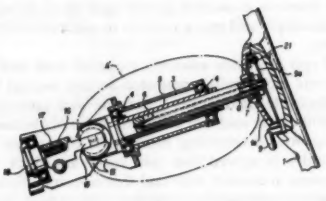
**Masumi Nishikawa, Toyoake, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Nov. 15, 1982, Ser. No. 441,632**

**Claims priority, application Japan, Nov. 12, 1981, 56-167667[U]**

**Int. Cl.³ B62D *1/18***

**U.S. Cl. 74—493** **5 Claims**



1. A locking mechanism for a telescopic steering wheel comprising:

a housing;

an outer cylinder rotatably supported within said housing;
a locking member slidably mounted within said outer cylinder;
a steering shaft movably mounted within said outer cylinder, engaged with said locking member and operatively connected to said steering wheel;
a locking rod rotatably mounted in said steering shaft and engaged with said locking member for attaining a locked or unlocked position of said locking member;
a telescopic lever connected to said locking rod and movable between said locked and unlocked position;
spring means for continuously urging said telescopic lever into said locked position; and
recessed means formed on a main body portion of said steering wheel for engaging said telescopic lever thereon in said unlocked position.

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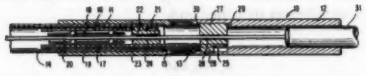
**4,516,441**

## FLEXIBLE REMOTE CONTROL WITH IMPROVED ANCHORING OF OUTER BALL RACES

**Alan H. Paynter, Brookfield, Conn., assignor to Incom International Inc., Pittsburgh, Pa.**

**Filed Jan. 3, 1983, Ser. No. 455,239**
**Int. Cl.³ F16C *1/10***
**U.S. Cl. 74—501 R** **12 Claims**



1. In a flexible remote control which has a push-pull blade movably supported in flexible cylindrical tubing by ball cage strips disposed between the opposite faces of said blade and two outer ball races, each end of said tubing being fastened to an end fitting formed by two rigid cylindrical tubes screwed together, the improvement within each said end fitting comprising a slidable anchor attached to an end of one of said races and having a side in slidable contact with the other of said races, said slidable anchor being slotted for the passage of said blade therethrough, and a fixed anchor attached to an end of the other of said races and slotted for the passage of said blade therethrough, at least part of said fixed anchor being cylindrical to permit rotation of said fixed anchor in a cylindrical recess formed between said two cylindrical tubes, and said fixed anchor being held in said recess substantially without longitudinal play.

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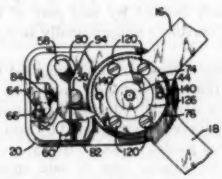
**4,516,442**

## RATCHET DEVICE

**Duane L. Davis, 1225 Boston Ave., Longmont, Colo. 80501**

**Filed Jan. 6, 1982, Ser. No. 337,415**
**Int. Cl.³ G05G *5/06***
**U.S. Cl. 74—529** **17 Claims**



5. A ratchet device comprising:
a housing assembly having a generally open interior;
an axle member mounted to said housing assembly in the interior thereof and defining an axis of rotation;
first and second mounting members positioned in said interior in spaced-apart relation to one another, said mounting members oriented symmetrically about a plane defined by the axis of said axle member and a mid-point between said first and second mounting members whereby said first mounting member is positioned on a first side of said plane and said second mounting member is positioned on a second side of said plane, said mounting member being first and second posts oriented along axes parallel to said axis of rotation, said pawl member being L-shaped in configuration and having an annular end opposite said free end and a mid-portion, said annular end being received on a selected one of said posts, said pawl arm passing through said plane;
a circular ratchet wheel mounted on said axle for rotation in said housing assembly, said ratchet wheel including a plurality of circumferential ratchet teeth, each said ratchet tooth being canted in an angular direction with respect to said axis, said ratchet wheel being selectively mountable on said axle in one of a first orientation wherein said ratchet teeth are canted in a first angular direction and a second orientation wherein said ratchet teeth are canted in an opposite angular direction;
a pawl member selectively mounted to one of said first and second mounting members and having a free end adapted for engaging said ratchet teeth, the selective mounting of said pawl member to one of said first and second mounting members corresponding to the first and second orientation of said ratchet wheel;
bias means associated with said pawl member for biasing said free end into engagement with said ratchet teeth; and
a rotatable detent shaft extending into the interior of said housing assembly between the mid-portion of said pawl member and said ratchet wheel, said detent shaft having a notch adapted to receive the mid-portion of said pawl arm whereby said free end is engaged with said ratchet teeth when said mid-portion is received by said notch and whereby said free end is disengaged from said ratchet teeth when said notch is rotated away from said mid-portion.

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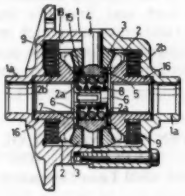
**4,516,443**

## RESTRICTION DEVICE FOR DIFFERENTIAL GEAR

**Hideo Hamano, and Yasunori Koga, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 3, 1982, Ser. No. 345,392**
**Claims priority, application Japan, Feb. 9, 1981, 56-16945[U]**
**Int. Cl.³ F16H *1/44;* F16D *13/60***
**U.S. Cl. 74—711** **8 Claims**



1. A differential gear for an automobile, comprising:
a differential casing;
a pair of side gears;
first and second pinions, said side gears and said pinions being meshed with each other;
a plurality of multi-plate clutches provided between cylindrical portions of said side gears and inner surfaces of said differential casing for restricting differential movement of said side gears in said differential casing, wherein said

multiplate clutches further comprise a plurality of first friction plates fixed to said side gears and a plurality of second friction plates fixed to said differential casing, each of said first and second friction plates being alternately disposed so as to contact with each other and form at least first and second opposing frictional faces; and

means for restricting differential movement of said side gears wherein said first opposing friction face includes a cold rolled face and the second opposing face includes a self-lubricating agent coated face having a plurality of lattice-shaped oil grooves formed thereon and wherein said agent contains molybdenum particles.

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**4,516,444**

## HIGH-LOW BRAKED GEAR DRIVE

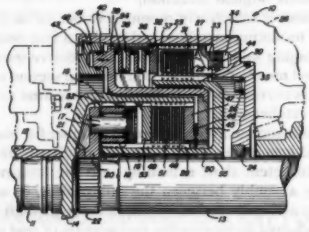
**Charles H. Herr, Jr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**PCT No. PCT/US80/00167, § 371 Date Feb. 19, 1980, § 102(e) Date Feb. 19, 1980, PCT Pub. No. WO81/02453, PCT Pub. Date Sep. 3, 1981**

**PCT Filed Feb. 19, 1980, Ser. No. 177,681**

**Int. Cl.³ F16H** *3/44, 57/10;* **B60K** *41/24;* **F16D** *67/02*

**U.S. Cl. 74—781 R** **7 Claims**



1. In a power transmission system (10) having brake (27) and clutch means (28), improved means for selectively operating the clutch means comprising:

a first fluid pressure-operated force-applying means (33,34);

a second fluid pressure-operated force-applying means (40,41);

spring means (38) biasing said brake and clutch means to an engaged condition; and

force transfer means associated with said force-applying means (39) for causing alternatively (a) said brake means to be in the engaged condition and said clutch means to be in a released condition as a result of force being applied only by said first force-applying means, (b) said brake means to be in the released condition and said clutch means to be in the engaged condition as a result of forces applied by both said first and second force-applying means, or (c) said brake and clutch means concurrently to be in the engaged condition as a result of elimination of application of forces by the force-applying means.

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**4,516,445**

## POWER-DRIVEN SCREWING TOOL FOR PRESSURE VESSEL HEADS

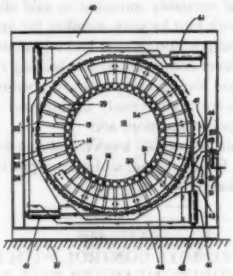
**Antoine Wlodarski, 6500 Léon Derome St., Montreal, Canada H1M 1S4**

**Filed Jul. 6, 1983, Ser. No. 511,228**

**Int. Cl.³ B25B** *13/00*

**U.S. Cl. 81—57.36** **11 Claims**

1. An assembly for manipulating a plurality of screw-type fasteners disposed in a bolting circle, comprising: a plurality of wrenches of a number equal to that of said fasteners, each having a fastener fitting inner end portion and an elongated handle generally outwardly extending from said inner end portion and having an outer end portion, tying means pivotally attaching to one another the outer end portions of said wrench handles to form a tying circle and including an elongated rigid tie member for each pair of wrenches, each tie member including means to adjust its length, a pair of pivot members carried by the two ends of said tie member and pivotally connected to the outer end portions of said pair of wrenches, and



means permitting translation movement of said pivot members along the length of the handles of said pair of wrenches, and power-operated means to rotate said tying circle, said power-operated means including a hydraulic cylinder and piston arrangement connected to the tying circle at one end and to a stationary member at its other end.

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**4,516,446**

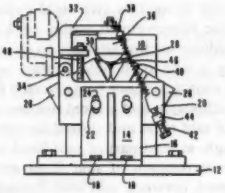
## PRECISION ROTATING ROD GUIDE

**Paul H. Flohn, East Orange, N.J., assignor to North American Philips Lighting Corporation, New York, N.Y.**

**Filed Feb. 14, 1983, Ser. No. 465,959**

**Int. Cl.³ B65H** *23/32;* **B23B** *25/00*

**U.S. Cl. 82—38 A** **5 Claims**



1. A rod guide and sensor assembly, comprising:

a sensor for sensing a longitudinally traveling rod traveling relative to said sensor and proximate said sensor; and

a pair of rod guides positioned on opposite sides of said sensor for defining a path of travel for a longitudinally traveling rod and for guiding a longitudinally traveling rod along the path of travel relative to and proximate said sensor, each of said rod guides comprising;

three spherical bearings symmetrically disposed around the rod travel path defined by said pair of rod guides for guiding a rod traveling longitudinally along the rod travel path;

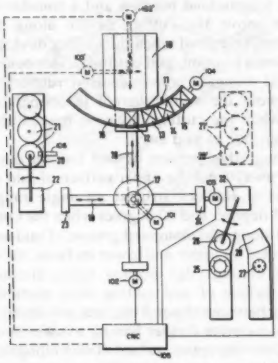
bearing mounting means for mounting said three spherical bearings for rotation about their respective centers at their respective symmetrically disposed positions to permit a longitudinally traveling rod guided by said spherical bearings of said rod guides to rotate freely; and

biasing means for biasing one of said spherical bearings toward the other of said spherical bearings for maintaining a portion of longitudinally traveling rod between and guided by said pair of rod guides sufficiently vibration-free to permit said sensor to accurately sense the portion of rod proximate said sensor while permitting the longitudinally traveling rod to rotate freely.

## 4,516,447
## NUMERICALLY CONTROLLED GROOVE-STAMPING MACHINE

**Franz Schneider, Göppingen, and Rolf Ruhl, Rechberghausen, both of Fed. Rep. of Germany, assignors to L. Schuler GmbH, Fed. Rep. of Germany**

**Filed May 16, 1980, Ser. No. 150,292**
**Claims priority, application Fed. Rep. of Germany, May 16, 1979, 2919687**
**Int. Cl.³ B21D *28/22***
**U.S. Cl. 83—71** **1 Claim**



1. A numerically controlled groove-stamping machine for processing workpieces including

a numerically controlled automatic multiple tool set comprising a plurality of individual tools,

an indexing unit means for presenting workpieces for engagement by at least one of said individual tools,

positioning drive means for rotating the indexing unit about a rotational axis in a stepwise fashion,

means for displacing the indexing unit along a first path, and

means for displacing the indexing unit along a second path which extends substantially at a right angle to the first path and to the rotational axis, and in that

means are provided for bringing the respective tools of the tool set into engagement in an individually controllable manner in accordance with work steps to be executed by the groove-stamping machine.

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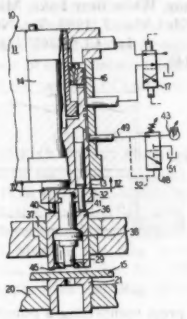
## 4,516,448
## PUNCH AND RAM ASSEMBLY FOR PUNCH PRESS

**Ronald C. Hill, Corfu; Richard M. Stein, Lancaster; Raymond J. Bzibziak, Akron, and Robert Goodwill, North Tonawanda, all of N.Y., assignors to Houdaille Industries, Inc., Ft. Lauderdale, Fla.**

**Filed Sep. 7, 1982, Ser. No. 415,600**
**Int. Cl.³ B26D *7/04***
**U.S. Cl. 83—137** **7 Claims**

1. In a punch and ram assembly having a movable ram carrying a removable punch with a punch guide and stripper surrounding portion of the punch, the punch having limited axial movement relative to the guide and stripper, the improvement of hydraulic pistons carried by the ram and extendable into contact with a top surface of the guide and stripper to urge the guide and stripper against a workpiece contacted by the punch, means allowing limited independent movement of the ram and pistons and the punch and guide and stripper whereby the punch guide and stripper may be maintained against the workpiece top surface while the punch passes through and back through the workpiece in response to ram movement, the punch guide and stripper carried by the punch for movement away from the workpiece in dependent response to movement of the punch, at least portions of the punch intermediate a punch head end and a punch tip end having the punch periphery engaging and guided by a guide means cooperating between the punch and the guide and stripper for limiting the



movement of the punch relative to the guide and stripper and for retaining the guide and stripper on the punch.

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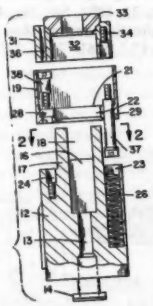
## 4,516,449
## TOOL HOLDER WITH WORK RELEASE MECHANISM

**Bobby R. Boyette, 11519 Belton Dr., Dublin, Calif. 94566**

**Continuation-in-part of Ser. No. 364,462, Apr. 1, 1982, abandoned. This application Dec. 5, 1983, Ser. No. 558,390**
**Int. Cl.³ B26F *1/14*; B21D *45/00***
**U.S. Cl. 83—140** **3 Claims**

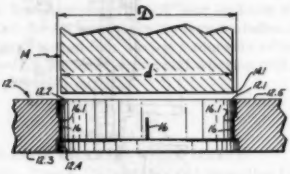


1. An improved tool holder for supporting a tool and stripping work pieces from the tool, including; a cylindrical mandrel having a boss extending axially from one end thereof, a first plurality holes extending into said one end and disposed parallel to the axis of said mandrel, said first plurality of holes being tapped a second plurality of holes extend into said upper one end of said mandrel parallel to said axis, for receiving springs therein a tubular collar secured to said one end of said mandrel and received about said boss, a bumper piston disposed within said collar and about said boss in freely translating fashion, a plurality of compression springs each disposed in one of said second plurality of holes, first screw means extending from said collar and secured in said first plurality of tapped holes, and second screw means extending through said collar and secured in said bumper piston, said second screw means including distal portions impinging on said compression springs in said second plurality of holes.

## 4,516,450
## SLUG-RETAINING DIE

**Edwin T. Shuttleworth, Point Pleasant, N.J., assignor to Wilson Tool Company, White Bear Lake, Minn.**

**Filed Mar. 7, 1983, Ser. No. 472,282**
**Int. Cl.³ B26F 1/14**
**U.S. Cl. 83—146** **6 Claims**



1. A punch press comprising a punch and a die having an opening receiving the punch during punching and retraction steps in a material-punching operation, the die having a face normally facing the punch, and including at least two inwardly-extending, elongated protrusions positioned and dimensioned to encounter and grip solely the peripheral edge of a punched slug of workpiece material that exceeds the corresponding punch dimension during the punching step and to restrain the slug from following the punch during the retraction step, the at least two protrusions being elongated in the direction of punch travel and being spaced in the direction of punch travel from said die face.

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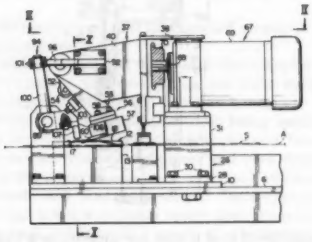
## 4,516,451
## APPARATUS FOR CUTTING AN ELONGATE RUBBERY STRIP

**Masaru Takeshita, Kodaira; Toshio Tokunaga, and Yuichiro Ogawa, both of Fuchu, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan**

**Filed Apr. 21, 1983, Ser. No. 487,278**
**Claims priority, application Japan, May 24, 1982, 57-87712**
**Int. Cl.³ B26D 7/10, 7/26**
**U.S. Cl. 83—171** **1 Claim**



1. An apparatus for cutting an elongate non-vulcanized rubbery strip movable on a predetermined plane and having longitudinal transverse directions, comprising:

transmitting means operative to transmit said elongate non-vulcanized rubbery strip in the longitudinal direction thereof and to be brought to a stop when the elongate non-vulcanized rubbery strip reaches a predetermined longitudinal position on said predetermined plane;

an anvil located underneath the predetermined plane and formed with an elongated groove extending obliquely to the transverse direction of said elongate non-vulcanized rubbery strip, the anvil having an upper surface substantially in parallel with said predetermined plane, an inner surface directed away from the upper surface at an acute angle and a guide surface spaced apart from the inner surface, the inner surface and the guide surface forming in combination said elongated groove;

a cutting mechanism arranged in opposing relation with said anvil across said predetermined plane and provided with a cutting device having a cutting edge portion, a heating device operative to heat the cutting edge portion of the cutting device to a predetermined temperature, a driving device operative to move the cutting device into or out of a cutting position in which the cutting edge portion of the cutting device is received in the elongated groove of said anvil through the elongate rubbery strip in said predetermined longitudinal position and a transfer device operative to move the cutting device along the elongated groove of said anvil when the cutting device is assumed in the cutting position, said cutting device being operative to cut said elongate non-vulcanized rubbery strip on bias throughout the width thereof in cooperation with said anvil when the cutting device is moved along the elongated groove of said anvil;

said cutting edge portion of said cutting device being directed away from the upper surface of said elongate non-vulcanized rubbery strip at an angle ranging between about 5 degrees and 20 degrees when the cutting device is moved along said elongated groove of said anvil and being constituted by upper and lower surfaces, the upper surface of said cutting edge portion being directed from said lower surface of said cutting edge portion at an angle ranging between about 5 degrees and about 20 degrees;

said cutting device further having a lower surface directed away from the upper surface of said elongate non-vulcanized rubbery strip at an angle ranging between about 10 degrees and about 40 degrees when the cutting device is assumed in said cutting position;

said guide surface of said anvil extending substantially in parallel with said lower surface of said cutting device and being spaced apart from said lower surface of said cutting device by a distance falling within a range between about 0.0 mm and about 0.2 mm, when the cutting device is assumed in said cutting position;

biasing means shiftable into or out of a pressing position in which the biasing means presses said elongate non-vulcanized rubbery strip against said anvil for maintaining the elongated rubbery strip in said predetermined longitudinal position, the biasing means being in contact with said upper surface of said anvil across said elongate rubbery strip throughout the width of the elongate rubbery strip; and

adjusting means operative to adjust positions of said anvil and said cutting mechanism with respect to said elongate non-vulcanized rubbery strip in said predetermined longitudinal position.

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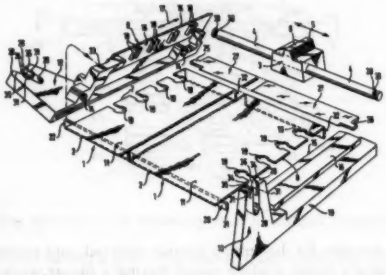
## 4,516,452
## PAPER CUTTER

**Gerald Dahle, Coburg, Fed. Rep. of Germany, assignor to Wilhelm Dahle Büro- und Zeichengerätefabrik, Coburg, Fed. Rep. of Germany**

**Continuation of Ser. No. 300,801, Sep. 10, 1981, abandoned. This application Dec. 2, 1983, Ser. No. 557,420**
**Claims priority, application Fed. Rep. of Germany, Sep. 23, 1980, 3035787**
**Int. Cl.³ B26D 7/02, 5/08**
**U.S. Cl. 83—455** **15 Claims**

1. A manually operable cutter which can be set on a table, said cutter comprising a base composed of a thin-walled steel sheet presenting an upper surface constituting a rectangular supporting surface, a bottom surface opposite said upper surface, and a lateral cutting edge along one side of said upper surface, means defining two holding jaws located in the region of said cutting edge, and above the surface of said base, a guide rail extending parallel to said lateral cutting edge and held between said jaws, and a cutting assembly including a rotary wheel cutter mounted on said rail for displacement therealong,

wherein: said means defining two holding jaws comprise two one-piece side members each including a respective holding jaw and extending along essentially the entire length of a respective one of the sides of said base which is perpendicular to said cutting edge, each said side member being an injection molded plastic member covering the respective side of said base, and each said side member including a portion disposed above said supporting surface of said base and presenting an inner edge extending at a right angle to said lateral cutting edge of said base and forming an abutment edge for the material to be cut; said lateral cutting edge is sharpened and itself acts as a counterblade for said wheel cutter; said cutter further comprises a support member for said supporting surface, said support member being disposed in the region of, and parallel to, said lateral cutting edge and resting against said bottom surface of said base, said support member having end portions and said side members being provided with recesses in which said end portions rest to support said support member; and said side members comprise supporting feet for supporting said cutter.



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**4,516,453**

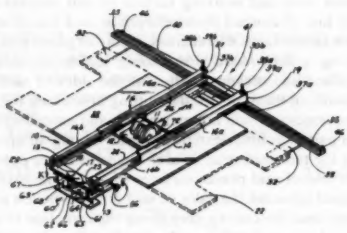
## CONTROL AND GUIDANCE APPARATUS FOR USE WITH POWERED TOOLS

**Walter J. Parham, Jr., Rte. #16, Box 20, Milton, Fla. 32570**

**Filed Sep. 24, 1984, Ser. No. 653,318**

**Int. Cl.³ B27B** *5/20, 9/04*

**U.S. Cl. 83—471.3** **4 Claims**



1. A control and guidance apparatus for use with a powered saw for making controlled cuts at an infinite number of angles in a workpiece comprising:

a. a pair of parallel elongated rail members telescopically adjustable in length for defining a cutting path for a saw;

b. a carriage moveably mounted on said rail members for independent movement therealong and with a saw mount opening in its surface; and

c. adjustable means for controlling the angle of cut of said saw in said workpiece including:

i. a third elongated rail member substantially perpendicular to said pair of elongated rail members;

ii. means mounted to the distal end of each of said elongated rail members for slidably engaging said third elongated rail member; and

iii. a cord means connected to the distal end of each of said pair of elongated rail members and provided through a series of pulleys and wound about a spool for imparting arcuate movement to said pair of elongated rail members whereby said pair of rail members telescopically lengthen as a function of the rotation of said spool.

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**4,516,454**

## STRAIGHT LINE CUTTING AND/OR GROOVE MACHINE FOR MOVING MATERIAL WEBS, ESPECIALLY FOR CORRUGATED PAPER WEBS

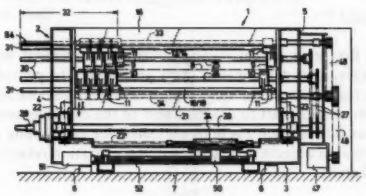
**Hans Mosburger, Weiherhammer, Fed. Rep. of Germany, assignor to BHS-Bayerische Berg-, Hutten- und Salzwerke Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Jan. 21, 1983, Ser. No. 459,960**

**Claims priority, application Fed. Rep. of Germany, Jan. 29, 1982, 3202914**

**Int. Cl.³ B26D** *7/26, 5/02, 1/24*

**U.S. Cl. 83—499** **12 Claims**



1. A straight line cutting and groove machine through which material webs are moved comprising, a plurality of cooperable pairs of rotatable tools arranged with one of each pair on one upper side of the web and the other of each pair on the opposite lower side of the web, guide members arranged transverse to the lengthwise direction of the web with the tools movably mounted along said guide members, drive means for effecting movement of the tools, adjustment means for shifting the tools along the guide members, a driven adjustment spindle associated with all of said tools on one side of the web and another driven adjustment spindle associated with all of said tools on the other side of said web, each spindle having a slide part and a shifting tube rigidly connected thereto, a controlled braking mechanism connected with each tool and operable together with the shifting tube, and a controlled retaining mechanism for moving each tool to a rest position.

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**4,516,455**

## THREE-KNIFE TRIMMER

**Gerd Peters, Langenhagen, Fed. Rep. of Germany, assignor to H. Wohlenberg KG GmbH & Co., Hanover, Fed. Rep. of Germany**

**Filed Oct. 25, 1982, Ser. No. 436,608**

**Claims priority, application Fed. Rep. of Germany, Jan. 19, 1982, 3201836**

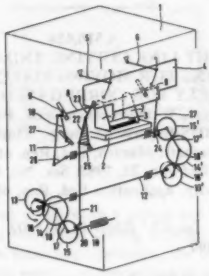
**Int. Cl.³ B26D** *5/08*

**U.S. Cl. 83—519** **7 Claims**

1. In a trimmer for books, magazines or the like including a knife assembly having a front knife and at least one side knife, guide means formed and coupled for guided displacement of said front knife and said side knife, and drive means including a rotatable shaft coupled to produce sequential displacement of said front knife and said side knife during a single revolution of said shaft, wherein the improvement in said trimmer comprises:

said drive means further including at least two separate gear trains each coupled for driving by said shaft and with one

of said gear trains being coupled to said front knife and a remainder of said gear trains being coupled to said side knife to produce displacement thereof, at least one of said gear trains being provided by a first set of gear wheels including a first gear wheel eccentrically mounted to said shaft, a third gear wheel coupled to drive the knives, and an intermediate gear wheel movably coupled to follow



said first gear wheel during eccentric movement while engaging and driving said third gear wheel to provide a gear train with a gear ratio which changes over one revolution of said shaft to enable dwell of the displacement of knives during each cycle of said shaft for positioning and removal of objects to be trimmed in registration relative to the knives.

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**4,516,456**

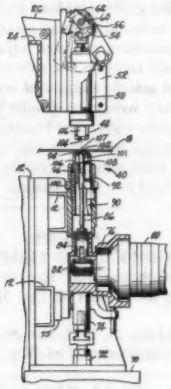
**PALLET NIBBLER**

**Adolph S. Dorosz, Beverly, Mass., assignor to USM Corporation, Farmington, Conn.**

**Filed Jun. 29, 1983, Ser. No. 508,862**

**Int. Cl.³ B26D** *5/08*

**U.S. Cl. 83—578** **11 Claims**



**1.** A machine for punching and nibbling a sheet of material, comprising:

a base movably supporting a sheet of material to be worked;

a common reciprocable shaft having punching means for punching a hole with a first stroke through said sheet of material, and having nibbling means also on said shaft adjacent said punching means for nibbling said material on the return stroke of said shaft for fast and simple utilization thereof; and

a die arrangement for guiding said reciprocable shaft.

**4,516,457**

**PLANE DIE-CUTTING MACHINE**

**Angelo Bartesaghi, Caduti a Fossoli 22, Lecco (Como), Italy**

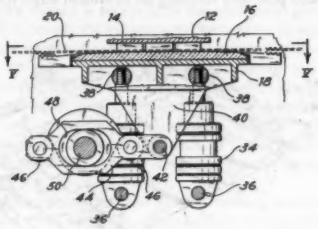
**Continuation of Ser. No. 348,510, Feb. 12, 1982, abandoned.**

**This application Apr. 18, 1984, Ser. No. 601,116**

**Claims priority, application Italy, Feb. 25, 1981, 19961 A/81**

**Int. Cl.³ B26D** *5/16*

**U.S. Cl. 83—646** **7 Claims**



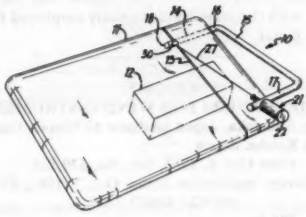
**1.** A machine for die-cutting laminar material, said machine comprising a frame, a plane punch having a planar working surface, a counter-punch having an arch shaped working surface movably arranged opposed said working surface of said plane punch, an appendix secured to said counter-punch and extending therefrom, control means for controlling the direction of movement of said counter-punch relative to said plane punch wherein said working surface of said counter-punch contacts said working surface of said plane punch within a die-cutting area along a line of contact extending transversely of said direction of movement of said counter-punch, said line of contact progressively advancing across the working surfaces of said plane punch and said counter-punch by operation of said control means, said control means comprising (1) a cam and cam follower pivotally secured to a portion of said appendix for operating said counter-punch in an alternate oscillatory movement, and (2) a plurality of cylinders each having one end pivotally secured to a portion of said frame, said cylinders each having an extensible end arranged in engagement with said counter-punch whereby said extensible ends of said cylinders cooperate with the oscillatory movement of said counter-punch to maintain said working surface of said plane punch in engagement with said working surface of said counter-punch along said line of contact therebetween as said line of contact progressively advances thereacross, a pair of plane extensions each having a downwardly extending leg terminating at a planar surface and arranged adjacent the sides of said plane punch extending through said die-cutting area along the direction of movement of said counter-punch and extending therebeyond, a pair of counter-extensions each having an upwardly extending leg terminating at an arch shaped surface opposed a respective one of said planar surfaces of said plane extensions and arranged adjacent the sides of said counter-punch extending through said die-cutting area along the direction of movement of said counter-punch and extending therebeyond, and meshing racks having a plurality of gear teeth provided on said planar surfaces of said plane extensions and said arch shaped surfaces of said counter-extensions within said die-cutting area and extending therebeyond, said meshing racks maintaining continuous meshed engagement between said plane extensions and said counter-extensions along progressive opposed portions thereof by the meshing of said plurality of gear teeth of said meshing racks within said die-cutting area and therebeyond during said alternate oscillatory movement of said counter-punch by said cam and cam follower whereby relative movement between said planar shaped working surface of said plane punch and said arch shaped surface of said counter-punch is prevented within said die-cutting area and therebeyond.

**4,516,458**

## SLICING DEVICE FOR FOODSTUFFS

**Julie Pomerantz, and Paul Feeney, both of 230 Fifth Ave., New York, N.Y. 10001**

**Filed Aug. 2, 1982, Ser. No. 404,537**
**Int. Cl.³ B26D** *1/26, 1/547*
**U.S. Cl. 83—651.1** **9 Claims**



1. Slicing apparatus for relatively firm foodstuffs comprising:

a baseboard having a groove extending transversely thereof;

a bore extending into one end of said baseboard through and beyond said groove toward the other end of said baseboard and such that such bore communicates with said groove at a juncture formed therebetween;

a U-shaped bar having a first leg, a second leg and a central portion;

the end portion of the first leg of said U-shaped bar extending into said bore beyond said groove and being provided with a slot disposed in said bore immediately below said groove and in a lateral position in alignment with said groove;

said end portion of said first leg being frictionally engaged in said bore to prevent lateral movement of said first leg in said bore and in turn to prevent lateral movement of said slot in said first leg from its lateral position in alignment with said groove, and said end portion of said first leg also being rotatable in said bore;

a passage exiting through the baseboard substantially adjacent the junction between the slot and the bore to accommodate the cutting element when replaced; and

a handle carried by the second leg of the U-shaped bar.

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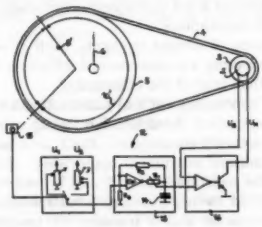
**4,516,459**

## DRIVE-CONTROL SYSTEM FOR A MICROTOME, IN PARTICULAR AN ULTRAMICROTOME

**Gerhard Kappl; Helmut Kranner, and Reinhard Lihl, all of Vienna, Austria, assignors to C. Reichert Optische Werke, Vienna, Austria**

**Filed Jul. 8, 1983, Ser. No. 512,098**
**Int. Cl.³ B26D** *7/06*
**U.S. Cl. 83—713** **7 Claims**



1. A rotary driven microtome having a control to dissipate vibrations prior to cutting a specimen, which comprise a specimen arm for holding a specimen, a knife positioned adjacent to said arm, drive means comprising an electric drive motor and a crank mechanism for moving said arm in an oscillating stroke movement, said stroke movement comprising a cutting movement in which a specimen on said arm is passed from a starting position over said knife to produce a thin section of said specimen and a return movement in which said specimen is returned near to said starting position along a path spaced from said knife, and a motor-control system for varying the speed of said electric motor, a cutting signal generated by said control system, a return signal generated by said control system and a transition signal generated by said control system, said transition signal controlling deceleration of said specimen arm to dissipate vibrations prior to the cutting movement.

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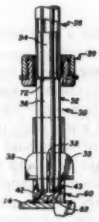
**4,516,460**

## METHOD AND APPARATUS FOR SLITTING SHOTGUN SHELL WADS

**Donald F. Vizecky, Minneapolis, Minn., assignor to Steel Handlers' Manual and Steel Handloaders' Components, Inc., Minneapolis, Minn.**

**Filed Sep. 7, 1982, Ser. No. 415,154**
**Int. Cl.³ B26D** *3/12, 5/10;* **F42B** *33/00*
**U.S. Cl. 83—861** **7 Claims**



1. In combination with a shotgun shell reloading device which has a fixed plate and a ram member movable with respect to the fixed plate, and where a portion of the ram member is a hollow tube having an open end adjacent the fixed plate, an apparatus for causing a series of uniformly spaced longitudinal cuts of the same length through a cylindrical peripheral cup wall of a plastic shotgun shell wad, said apparatus comprising:

a cylindrical member having an upper end portion and a lower portion, the diameter of the upper end portion being less than that of the lower end portion with a shoulder therebetween;

said upper portion of reduced diameter being designed to be secured within the open end of the hollow tube of the ram member with said shoulder engaging the lower end of the hollow tube; and

said lower portion having a plurality of cutting blades uniformly spaced about the lower portion and projecting radially outwardly therefrom, each of said cutting blades having a downwardly facing cutting edge spaced from a bottom edge of said cylindrical member the same predetermined distance, so that when the cylindrical member is secured to the hollow tube of the ram member, the lower portion thereof is inserted into a top open end of a cylindrical cup wall of a plastic shotgun shell wad positioned on the fixed shotgun shell wad positioned on the fixed plate of the shotgun shell reloading device, and the ram member is moved toward the fixed plate, the cup wall of the wad has a plurality of longitudinal slits of equal length made therethrough by cutting blades, the lower end of said cylindrical member being chamfered to facilitate entry of the lower portion of said cylindrical member into the cup wall of the wad; and

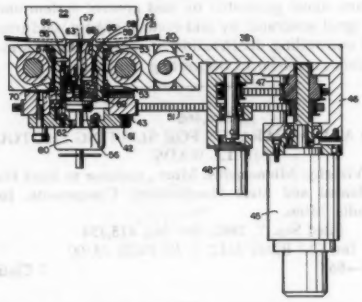
means for limiting downward movement of the cylindrical member so that the longitudinal slits extend from the top end of the wad to an area spaced from a lower base portion of the wad by a predetermined distance.

**4,516,461**

## KNIFE ASSEMBLY FOR TAPE LAYING MACHINE

**Andrew P. Schaeffer, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio**

**Filed Mar. 5, 1984, Ser. No. 586,420**
**Int. Cl.³ B26D *3/08***
**U.S. Cl. 83—881** **3 Claims**



**1.** A knife assembly for a tape laying machine utilizing composite tape carried on a backing tape, comprising: a base; a tape platen affixed to said base, having a surface for supporting tape movement in a first direction; a knife slide, movable on said base in a second direction, coordinate to said first direction; means for moving said knife slide in said second direction; a spindle, rotatably supported in said knife slide, having its rotary axis normal to said first and second direction; a knife support, axially movable in said spindle in a direction parallel to said normal rotary axis; an elongate knife member, carried in said knife support; means for rearwardly biasing said knife support away from said platen; means for forwardly biasing said knife support to position said knife member a predetermined distance from said tape platen; a knife edge on said knife member, substantially parallel to a plane formed by said first and second directions; a tape presser member carried by said slide; and yieldable means for biasing said tape presser member toward said platen wherein said knife edge is orientable to the resultant direction of said tape movement and knife slide movement, and wherein said tape presser member will snugly press against the composite tape, holding it to the platen while accommodating variations in tape thickness, and wherein said knife member may completely sever the composite tape without severing the backing tape.

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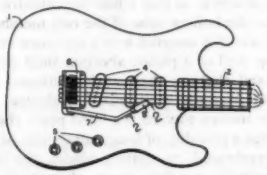
**4,516,462**

## TREMOLO AND ELECTRONIC CONTROL DEVICE FOR STRINGED INSTRUMENTS

**Arne Schulze, 2716 3rd St. #2, Santa Monica, Calif. 90405**

**Filed Mar. 28, 1983, Ser. No. 479,271**
**Int. Cl.³ G10D *3/00*; G10H *1/045, 3/18***
**U.S. Cl. 84—1.16** **12 Claims**



**1.** A guitar system including a single arm for controlling both tremolo effects and output volume comprising:

an electric guitar;

means for controlling tremolo effects by stretching and relaxing the strings of the guitar, said means including a movable tailpiece for holding the strings, and a tremolo arm mechanically coupled to said tailpiece, said arm extending to the area of playing the guitar; and

manually operable electronic control means mounted on said tremolo arm for controlling and varying the output volume from said guitar;

whereby the guitar player may control both the output electronic sound effects of the guitar and the tremolo effects, with the same hand normally employed for plucking the guitar.

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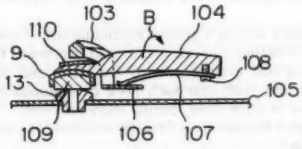
**4,516,463**

## KEY MECHANISM FOR WIND INSTRUMENTS

**Fusao Satoh, Shizuoka, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan**

**Filed Oct. 6, 1983, Ser. No. 539,525**
**Claims priority, application Japan, Oct. 7, 1982, 57-176583**
**Int. Cl.³ G10D *7/08***
**U.S. Cl. 84—385 R** **2 Claims**




**1.** An improved key mechanism for wind instruments in which first and second tone holes formed in the body of a wind instrument are simultaneously closed and opened by a lever action,

a first hinge rod axially rotatably arranged on said body,

a second hinge rod arranged on said body and driven for axial rotation by said lever action,

a first key fixed to said first hinge rod and holding a first pad cup for said first tone hole,

a second key fixed to said second hinge rod and holding a second pad cup for said second tone hole, and

a spring means attached to said second key and biasing said first key so that said first pad cup should close said first tone hole,

the operation of said lever action permitting said second key to raise said first pad cup apart from said first tone hole.

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**4,516,464**

## VALVELESS TRUMPET INSTRUMENT

**John H. Hastings, 591 Elmgrove Rd., Rochester, N.Y. 14606**

**Filed Nov. 12, 1982, Ser. No. 440,798**
**Int. Cl.³ G10D *7/10***
**U.S. Cl. 84—387 R** **15 Claims**

**1.** A musical wind instrument, comprising

a single mouthpiece,

a plurality of tubular trumpets, each of which has an axial bore having a predetermined, effective axial length different than that of the others, and

means connecting each of said trumpets to said mouthpiece for operation thereby solely by lip vibrations applied to said mouthpiece.

**13.** A musical instrument comprising

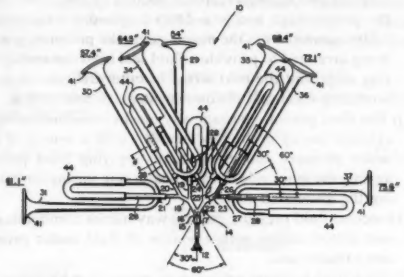
a tubular mouthpiece,

a manifold having a single, tubular inlet connected to said mouthpiece, and a plurality of spaced, tubular outlets communicating at their inner ends with said inlet, and

a plurality of tubular horns connected by said outlets to said mouthpiece for operation thereby,

each of said horns comprising a first tubular section connected to one of said outlets, a second tubular section

spaced from said first section, and a third tubular section adjustably interconnecting said first and second sections



thereby to permit adjustment of the overall length of each horn.

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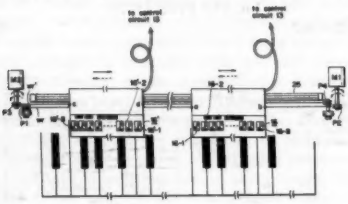
**4,516,465**

## DEVICE FOR GUIDING A PLAYER IN PERFORMANCE OF A KEYBOARD INSTRUMENT

**Hirofumi Kani, 264-29, Takata-cho, Kohoku-ku, Yokohama-shi, Kanagawa-ken, Japan**

**Filed Mar. 18, 1983, Ser. No. 476,732**
**Int. Cl.³ G09B *15/08***
**U.S. Cl. 84—470 R** **20 Claims**



1. A device for guiding the player in performance of a keyboard instrument comprising:

movable indicating means having a predetermined number of indicating elements corresponding to keys of the keyboard instrument;

shifting means associated with said indicating means;

means for activating said indicating elements on said indicating means for sequentially specifying the keys to be acted upon while the player plays a tune; and

means for exciting said shifting means for shifting said movable indicating means to a position capable of indicating a key corresponding to the next note on the musical score by said indicating elements when the key corresponding to said next note is outside the zone of indication of the movable indicating means.

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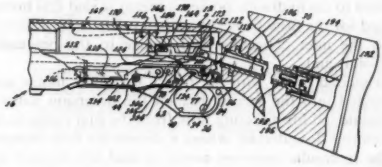
**4,516,466**

## MECHANISM PROVIDING POSITIVE SAFETY WITH BOLT LOCKED

**Fred Jennie, Santa Ana, Calif., assignor to Weatherby, Inc., South Gate, Calif.**

**Continuation-in-part of Ser. No. 261,527, May 7, 1981, abandoned. This application Jan. 17, 1983, Ser. No. 458,559**
**Int. Cl.³ F41C *5/00*; F41D *3/00***
**U.S. Cl. 89—145** **8 Claims**

1. A gun mechanism for a gun having a hammer engageable with a firing pin, a sear engageable with the hammer adapted for releasing the hammer for firing, a trigger member, a disconnector member having connections with the trigger member and having a part engageable with the sear for disengaging it from the hammer for firing, the gun mechanism having a bolt and a bolt carrier including an extending member extending from the bolt carrier having proximity to the trigger and having a position wherein the bolt is in fully closed position, and means including a link member providing engagement between said extending member and the disconnector member, the bolt



carrier and extending member being constructed whereby in any position other than the closed and locked position of the bolt and before movement of the bolt, the said link member engages said extending member and positively acts on the said disconnector member whereby to positively hold it in a position to prevent it from bringing about disengagement between the sear and the hammer.

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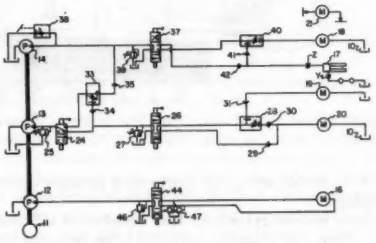
**4,516,467**

## METHOD AND APPARATUS FOR CONTROLLING A ROTARY PERCUSSIVE HYDRAULIC DRILL

**Keith Keeney, Clintwood, Va., and Dennis J. Wehner, Baden, Pa., assignors to Schroeder Brothers Corporation, McKees Rocks, Pa.**

**Filed May 27, 1983, Ser. No. 498,977**
**Int. Cl.³ F15B *13/09***
**U.S. Cl. 91—31** **17 Claims**



1. A quick changeover hydraulic circuit for use in a first mode or a second mode, controllable in each mode by the same flow regulator comprising:

a pressure compensated flow regulator;

a pressure compensated priority flow divider having a regulated output and a bypass output;

a first branch circuit comprising:

a hydraulic powered means;

a diversion valve for directing flow to the hydraulic powered means or said priority flow divider;

a first constant volume pump for delivering flow to said diversion valve;

a second branch circuit comprising:

inlet and outlet connectors;

a hydraulic percussion motor for a drill steel hammer and a rotary hydraulic motor for an auger, only one of which is in the circuit at one time and being between said inlet and outlet connections when in the circuit;

a second constant volume pump for delivering flow to the said inlet connector;

said pressure compensated flow regulator arranged for diverting flow around said second pump;

an interbranch circuit comprising;

said priority flow divider arranged for distributing flow with the regulated output connected to the hydraulic powered means and the bypass output connected to said inlet connector;

such that:

in a first mode with the hydraulic percussion motor connected into the second branch the diversion valve is positioned for the flow from the first pump to be delivered to the hydraulic powered means in said first branch and for the flow from the second pump to be delivered to the inlet connector and thence to the percussion motor; and

in a second mode with the rotary hydraulic motor connected into the second branch the diversion valve is positioned for directing flow from the first pump to the priority flow divider where it distributes flow between the hydraulic powered means in said first branch and the second branch and for delivering flow from the second pump, combined with flow from the flow divider to the inlet connector and thence to the rotary hydraulic motor.

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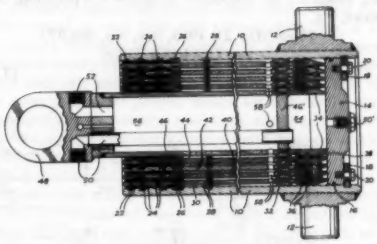
**4,516,468**

## DOUBLE ACTING TELESCOPIC CYLINDER CONSTRUCTION

**Merle M. Sheriff, Carlsbad, Calif., assignor to Hydraulic Technology Corporation, Naples, Fla.**

**Filed Jan. 10, 1983, Ser. No. 456,122**
**Int. Cl.³ F01B 7/20**
**U.S. Cl. 91—169** **11 Claims**



1. A double acting telescopic fluid pressure cylinder, comprising:

(a) a hollow cylindrical base member of substantially uniform wall thickness arranged to be mounted for support,

(b) the base member having an end closure at one end defining an adjacent cylinder cavity,

(c) the base member having near its open end a set of longitudinally spaced machined grooves on its interior surface removably mounting outer end performance rings,

(d) at least one telescoping cylinder stage of substantially uniform wall thickness slidably received through said rings in the base member,

(e) each said uniform wall thickness telescoping cylinder stage having a set of internal grooves machined in its wall surface near its outer end removably mounting outer end performance rings, each cylinder stage also having near its inner end an internal groove machined in its wall surface removably receiving a lifting ring arranged for abutment with the adjacent inner cylinder stage,

(f) a hollow piston stage of substantially uniform wall thickness slidably received through the rings in the innermost cylinder stage and arranged for abutment with the lifting ring of the adjacent cylinder stage,

(g) closure members adjacent the inner and outer ends of the hollow piston stage defining a piston cavity between them,

(h) each stage having in its wall surface near its inner end at least one external annular piston ring receiving groove disposed outwardly of said lifting ring groove,

(i) fluid sealing piston ring means mounted removably in said external piston ring receiving groove on the inner end of the piston stage and any desired cylinder stage sequentially outward from the piston stage, the piston ring means being arranged to provide a fluid seal between each piston ring stage and the next adjacent outer cylinder stage for rendering each said piston ring stage double acting,

(j) first fluid pressure passageway means communicating the cylinder cavity in the base member with a source of fluid under pressure and exhaust for applying fluid pressure against the inner side of each piston ring means for extending the associated stage,

(k) second fluid pressure passageway means communicating said piston cavity with a source of fluid under pressure and exhaust, and

(l) third fluid pressure passageway means in each piston ring stage communicating said piston cavity with the outer side of each piston ring means for applying fluid under pressure thereto for retracting the associated stage.

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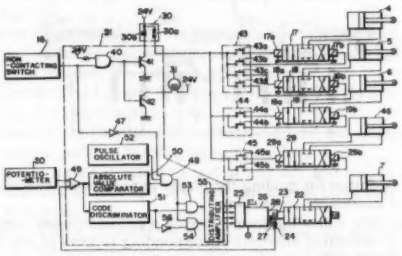
**4,516,469**

## ELECTRIC HYDRAULIC CONTROLL DEVICE FOR A CONSTRUCTION VEHICLE

**Yoshito Sato, Hirakata; Tokuhiro Yato, Yawata; Hidemi Maeo, and Yoshio Tsutsumi, both of Hirakata, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed May 25, 1982, Ser. No. 381,701**
**Claims priority, application Japan, May 26, 1981, 81/79799**
**Int. Cl.³ F15B 13/16**
**U.S. Cl. 91—362** **7 Claims**




5. An electric hydraulic control device for a construction vehicle comprising:

first signal generating means for generating a first electric signal corresponding to the placement of a first operation lever in one of two predetermined positions;

a first electric hydraulic control system for controlling a first control valve by means of said first electric signal, and for supplying hydraulic fluid to a first hydraulic cylinder for controlling the movement of a first work tool along a first degree of freedom;

second signal generating means for generating a second electric signal corresponding to the stroke of said first operation lever during operation; and

a second electric hydraulic control system for controlling the position of a spool of a second control valve by means of a difference between said second electric signal and a third electric signal formed in an electric servo mechanism and corresponding to the position of said spool, said electric servo mechanism having a stepping motor driven in response to said difference, a stepping cylinder, and a differential transformer, and controlling the movement of said first work tool along a second degree of freedom.

## 4,516,470
## UNBALANCED HYDRAULIC AMPLIFIER VALVE ASSEMBLY

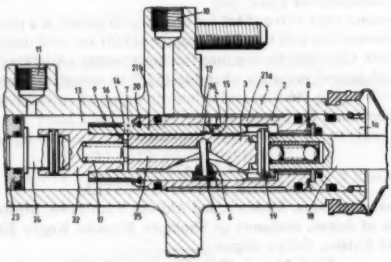
**Rolf Warnecke, Gifhorn; Heinz Rühmer, Wolfenbüttel, and Günter Leineweber, Gifhorn, all of Fed. Rep. of Germany, assignors to Volkswagenwerk AG, Wolfsburg, Fed. Rep. of Germany**

**Filed Jun. 17, 1981, Ser. No. 274,446**

**Claims priority, application Fed. Rep. of Germany, Jun. 20, 1980, 3023027**

**Int. Cl.³ F15B** *7/00*

**U.S. Cl. 91—374** **12 Claims**



1. In an unbalanced hydraulic valve assembly including a first plunger element; a second plunger element having an axial bore receiving, with a loose fit, said first plunger element for axial and radial displacement relative to said second plunger element; a work chamber within said valve assembly; a pressure supply conduit provided in said valve assembly for introducing pressurized hydraulic fluid into said valve assembly; control port means in one of said plunger elements, said control port means being arranged asymmetrically relative to the circumference of said plunger elements; said control port means being arranged for permitting or blocking flow from said pressure supply conduit to said work chamber dependent upon the relative axial position of said plunger elements with respect to one another; the improvement comprising a force transmitting member supported in said second plunger element for displacement transversely to the direction of relative axial motion of said plunger elements and relative to said second plunger element, said force transmitting member engaging said first plunger element and having a surface, means for providing a continuous hydraulic communication between the pressure supply conduit and said surface for exposing said surface to the pressurized hydraulic fluid for pressing said first plunger element against an inner wall face of said axial bore provided in said second plunger element; and further wherein said first plunger element and said second plunger element being free from annular seals between said plunger elements.

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## 4,516,471
## POWER STEERING VALVE WITH CHAMFERED LANDS

**James J. Duffy, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Dec. 28, 1981, Ser. No. 335,123**

**Int. Cl.³ F15B** *9/10*

**U.S. Cl. 91—375 A** **6 Claims**

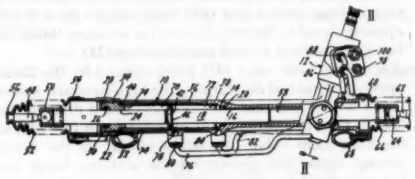
1. In a power steering gear comprising a fluid motor adapted to be connected to a driven member, said fluid motor having opposed fluid pressure chambers, a steering shaft, a positive displacement fluid pump, and a fluid circuit for controlling pressure distribution from said pump to said fluid motor;

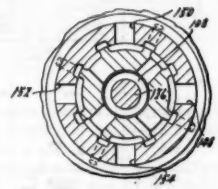
a valve assembly in said fluid circuit comprising a rotary valve sleeve having internal valve lands, a rotary shaft valve connected to and rotatable with said steering shaft, and external valve lands on said shaft valve;

a yieldable mechanical connection between said steering shaft and said driven member, a positive driving connection between said valve sleeve and said driven member;

a fluid connection between said pump and said pressure chambers comprising a first passage extending from said valve assembly to one pressure chamber and a second passage extending from said valve assembly to the other pressure chamber, a fluid supply passage extending from said pump to said valve assembly and a fluid return passage between said valve assembly and a flow inlet region of said pump;

the external valve lands of said shaft valve registering with the internal valve lands of said valve sleeve whereby said registering lands define in part said first passage and said second passage, the internal valve lands on said sleeve adjacent said supply passage being chamfered throughout their length whereby a pressure buildup occurs in said





pressure chambers at a controlled rate dependent on the torque applied to said steering shaft;

the external lands on said shaft valve being spaced angularly about the axis of said shaft valve and being formed by axially extending crescent-shaped grooves adapted to be formed by rotary milling cutter, the internal valve lands in said sleeve being straight-through lands defined by axially extending groove adapted to be formed by a linear broaching tool, the chamfer on said internal valve lands being of uniform dimension throughout their axial extent whereby said internal lands and said chamfers are adapted to be broached simultaneously with said linear broaching tool, and end rings in said valve sleeve on either axial end of said internal lands, said end rings having an internal diameter equal to the internal diameter of said internal lands.

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## 4,516,472
## HYDRAULICALLY-OPERATED BREAKING DEVICE

**Yoshikata Kobayashi, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Dec. 10, 1981, Ser. No. 329,435**

**Claims priority, application Japan, Dec. 26, 1980, 55-188890; Dec. 26, 1980, 55-188896**

**Int. Cl.³ F15B** *15/17, 13/044, 13/043*

**U.S. Cl. 91—392** **7 Claims**

1. A hydraulically-operated breaking device comprising:

a cylinder **(22)** into which a working liquid is fed;

a block **(34, 35)** for supporting said cylinder **(22)**;

a differential piston **(21)** inserted in said cylinder **(22)** so as to be able to move axially in the forward and backward directions and defining at the front end thereof a front

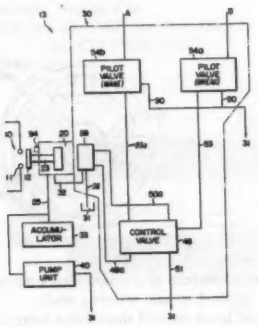
chamber (29) supplied with a high-pressure working liquid discharged from a high-pressure working liquid source (40) and at the rear end thereof a rear chamber (24), said differential piston (21) having a front pressure receiving surface (29*a*) facing said front chamber (29) at the front end and a rear pressure receiving surface (29*a*) facing said rear chamber (24) at the rear end, the rear pressure receiving surface (29*a*) having a larger area than that of the front pressure receiving surface (29*a*);

a switching unit (10) driven by said differential piston (21) to make and break an electric circuit;

an intermediate valve (28) having a making main valve (44) and a breaking main valve (41),

said making main valve (44) being opened by a breaker closing signal and transmitting to said rear chamber (24) the working liquid supplied from said high-pressure liquid source (40) to thereby close said switching unit (10), and said making main valve (44) being closed by a breaker opening signal to thereby prevent the working liquid from being transmitted to said rear chamber (24), and

said breaking main valve (41) being opened by the breaker opening signal and discharging the high-presusre working liquid within said rear chamber (24) into a drainage tank (31) to thereby opening said switching unit (10) and said breaking main valve (41) being closed by the breaker closing signal and preventing the working liquid from being discharged;




a control valve (46) having a control valve plug (46*a*) fitted in a control chamber (52) defined in said block (35),

said control valve (46) transmitting the breaker closing signal to said intermediate valve (28) to thereby close said switching unit (10) and transmitting the breaker opening signal to said intermediate valve (28) to thereby open said switching unit (10),

said control valve plug (46*a*) being inserted so as to be able to slide in one and the other directions in said control chamber (52) communicating with said rear chamber (24), said high-pressure working liquid source (40), and a low-pressure drainage tank (31) by means of first (50*a*), second (49*a*) and third passages (51), respectively, said control valve plug (46*a*) including first and second poppet valve plugs (46*b*, 46*c*) coupled in a straight line and disposed on the sides of said one and the other directions, respectively, chambers (52*a*, 52*b*) for make and break being defined in said control chamber (52), one on said one direction side of said first poppet valve plug (46*b*) and the other on said other direction side of said second poppet valve plug (46*c*), so that said first poppet valve plug (46*b*) connects said first and second passages (50*a*, 49*a*) and supplies the breaker closing signal to said intermediate valve (28) and said second poppet valve plug (46*c*) disaconnect said third passage (51) from said first passage (50*a*) and second passage (49*a*) when said control valve plug (46*a*) is moved in said one direction, and that said second poppet valve plug (46*c*) connects said first and third passages (50*a*, 51) and said first poppet valve plug (46*b*) disconnects said second passage (49*a*) from said first and third passages (50, 51) and said intermediate valve (28) receives a low-pressure signal, i.e., the breaker opening signal, which is supplied through the first passage (50*a*) when said control valve plug (46*a*) is moved in said other direction, and said control valve plug (46*a*) having passages (46*g*, 46*e*) to leak the high-pressure working liquid supplied through said second passage (49*a*) into said making and breaking chambers (52*a*, 52*b*);

a first pilot vaLve (54*b*) for making disposed in a passage connecting said making chamber (52*a*) and said drainage tank (31) and discharging the high-pressure working liquid in said making chamber (52*a*) to move said control valve plug (46*a*) in said one direction when receiving a command for make; and

a second pilot valve (54*a*) for breaking disposed in a passage connecting said breaking chamber (52*b*) and said drainage tank (31) and discharging the high-pressure working liquid in said breaking chamber (52*b*) to move said control valve plug (46*a*) in said other direction when receiving a command for break.

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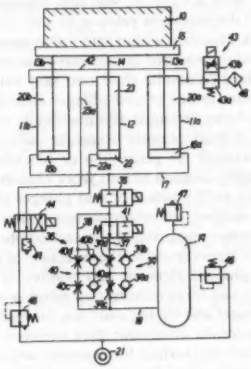
**4,516,473**

## CYLINDER DRIVING SYSTEM

**Naotake Oneyama, Kashiwa, and Akihisa Yoshikawa, Mastudo, both of Japan, assignors to Shokestu Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed May 7, 1981, Ser. No. 261,561**
**Int. Cl.³ F15B *21/00*; F04B *47/14***
**U.S. Cl. 91—462** **4 Claims**



1. A cylinder driving system comprising:

a common support frame for carrying a load thereon;

a plurality of balance air cylinders for supporting said load in a substantially balanced state;

at least one drive air cylinder having a smaller diameter than said balance air cylinders for driving the load up and down, said balance and drive air cylinders being fluidically disposed in parallel and having piston rods connected with said common support frame;

an air accumulator;

head chambers of said balance air cylinders being normally communicated through a balance pipeway with said accumulator so as to bring air pressure thereinto to produce a counteracting force against the weight of the load for supporting the load in a substantially balance state, said balance pipeway including a speed control device for switching the operation speed of said balance cylinders to a high or low speed to control an air flow rate, and means for opening rod chambers thereof to the atmosphere;

an air supply source;

means for connecting a head chamber and a rod chamber of said drive air cylinder to said air supply source; and

a change-over device in said means for connecting for selec-

tively interconnecting said chambers of said drive cylinder with said air supply source,

wherein said speed control device comprises:

first and second parallel bypass circuits in said balance pipeway, said first and second circuits being constructed so as to permit positive fluid flow through both of said bypass circuits in two directions, said first and second circuits respectively including air flow resistance means with mutually relatively low and high flow resistance values; and

means for selectively switching on and off air flow in said first bypass circuit having said low flow resistance value, whereby the operation speed of said balance cylinders may be switched between a high and a low speed.

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**4,516,474**

## TANDEM DIAPHRAGM BRAKE BOOSTER

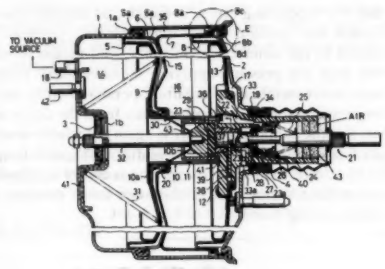
**Chiaki Ochiai, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Jun. 30, 1983, Ser. No. 509,430**

**Claims priority, application Japan, Jul. 6, 1982, 57-102389[U]**

**Int. Cl.³ F01B *19/00*; F15B *9/10***

**U.S. Cl. 91—519** **5 Claims**




1. A tandem diaphragm brake booster which comprises:

a housing;

first and second diaphragms disposed in said housing in spaced relation to each other;

a partition wall disposed between said first and second diaphragms within said housing for defining first, second, third and fourth chambers within said housing;

a securing member interconnecting said partition wall with said housing;

piston means secured to said first and second diaphragms and axially slidable therewith;

first fluid passage means provided in said piston means for fluid communication between said first and third chambers, said first chamber being in communication with a vacuum source;

second fluid passage means provided between said housing, and said partition wall for fluid communication between said second and fourth chamber;

third fluid passage means provided in said piston means for fluid communication between said third and fourth chambers;

valve means disposed in said third fluid passage means for preventing fluid communication between said third and fourth chambers and introducing atmospheric pressure into said fourth chamber, thereby creating pressure differentials between said first and second chambers and said third and fourth chambers, respectively; and

operator-operated means for actuating said valve means in response to manual operation;

wherein said housing further comprises a first shell section having a cylindrical outer wall with a shoulder portion and a second dish-shaped shell section;

said first diaphragm has a bead at its periphery and said bead of the first diaphragm is compressed between said shoulder portion of the first shell section and said securing member; and

said second diaphragm has an inner bead and an outer bead at its periphery and fourth fluid passage means provided between said inner bead and said outer bead and wherein said inner bead is secured air-tightly to said partition wall and said outer bead is compressed between said first shell section and said second shell section.

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**4,516,475**

## HYDROSTATIC PISTON MACHINE

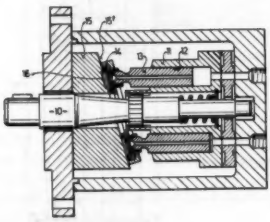
**Hans-Jürgen Fricke, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Continuation of Ser. No. 906,647, May 16, 1978, abandoned. This application Apr. 3, 1980, Ser. No. 136,971**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1977, 2730034**

**Int. Cl.³ F01B *13/04***

**U.S. Cl. 92—57** **8 Claims**



1. A hydrostatic piston machine, comprising a housing with a pressure fluid and forming a low pressure zone and a high pressure zone; a rotor in said housing; a plurality of pistons in said housing and rotatable with said rotor, said pistons including sliding shoes at the ends thereof; a displacing element operative for effecting reciprocation of said pistons, and having a surface including a contact portion which is in sliding contact with said shoes and separated therefrom by a film of a pressure fluid; and means for reducing viscous friction between said surface of said displacing element and said shoes during said sliding contact, said means including a closed arcuate recess formed in said contact portion of said surface of said displacing element and extending along an arcuate distance in the range 130°–180°, said recess being shallow of a relatively small depth and being located in the region of said low pressure zone and communicating with the latter.

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**4,516,476**

## ACTUATOR ASSEMBLY FOR AN INDUSTRIAL MANIPULATOR OR THE LIKE

**Brian M. Beaton, Erie, Pa., assignor to Lord Corporation, Erie, Pa.**

**Filed Apr. 14, 1983, Ser. No. 484,783**

**Int. Cl.³ F01B *29/04***

**U.S. Cl. 92—59** **5 Claims**

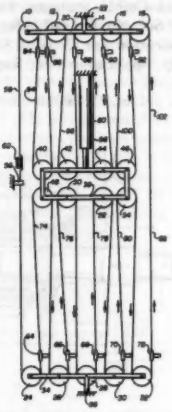
1. An actuator assembly for an industrial manipulator or the like, comprising:

a plurality of elongate actuator units each adapted to produce linear output motion in the direction of its central axis, means for interconnecting at least a first one of said units and a second one of said units to define a generally T-shaped array wherein said second unit extends transversely of and is moveable laterally by said first unit;

each of said units utilizing electrical and fluid energy during operation thereof and including an elongate rigid frame having inlet openings for receiving electricity and pressurized fluid conducted thereto, a pair of elongate support members mounted by and projecting forwardly from said

frame in laterally spaced and substantially parallel relationship to each other for longitudinal movement in unison with each other relative to said frame, drive means carried by said frame and driveably connected to said support members for imparting said movement thereto, said support members having passageways extending longitudinally thereof for conducting electricity and pressurized fluid forwardly from said frame through said support members and to the forwardmost end portions thereof;

said second unit being connected to said forwardmost end portions of said movement support members of said first unit for lateral movement of said second unit in response



to longitudinal movement of said support members of said first unit;

said inlet openings of said second unit including a first pair of inlet openings aligned with said support members of said first unit when said second unit is connected in one transverse orientation to said first unit and including a second pair of inlet openings aligned with said support members of said first unit when said second unit is connected in another transverse orientation relative to said first unit, whereby electricity and pressurized fluid is conducted to said second unit from said frame and through said support members of said first unit in either of said orientations of said second unit.

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**4,516,477**

## CLOSURE FOR OPENINGS IN PUMPS

**Edwin C. Lewis, P.O. Box 79631, Houston, Tex. 77279; Helmut Henschenmacher, Schwarzer Weg 26, Brachelen, Fed. Rep. of Germany (D-5142); Karl-Heinz Ecker, Wilhelmstrasse 38, Erkelenz, Fed. Rep. of Germany (D-5140); Hartmut Giernalczyk, Adalbert-Stifter-Str.12, and Siegfried Rutte, Gerhard-Schümmer-Str.21, both of Gellenkirchen, Fed. Rep. of Germany (D-5130)**

**Filed Sep. 26, 1983, Ser. No. 535,748**

**Claims priority, application Fed. Rep. of Germany, Sep. 24, 1982, 3235316**

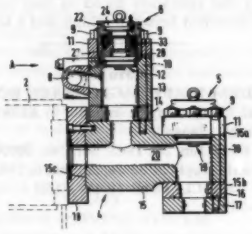
**Int. Cl.**[3] **F01B** *29/00;* **F04B** *21/00, 39/14*

**U.S. Cl. 92—128** **9 Claims**

1. In a removable closure for an opening in a pump housing or cover part including a supporting cover threadedly engageable with the housing or cover part over the opening, an inner cover member insertable between the supporting cover and opening to close the opening, a loadable and releasable pressure-applying member between the supporting cover and inner cover for applying closing pressure to the inner cover, and a device for loading the pressure-applying member, the improvement comprising:

a compression spring operatively interposed between the supporting cover and pressure-applying member to urge the pressure-applying member toward the inner cover; and

means to releasably urge said pressure-applying member away from said inner cover member against the force of and to compress said compression spring:



so that the supporting cover is initially adjustable inwardly toward the opening to an initial closing position with respect to the inner cover member, said means to releasably urge the pressure-applying member away from the inner cover member is thereafter operable thereby moving the pressure-applying member away from the cover member, and the supporting cover is again adjustable inwardly to a final closing position, whereafter said means is operable to release the pressure-applying member to allow said compression spring to urge the inner cover member with a final closing force.

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**4,516,478**

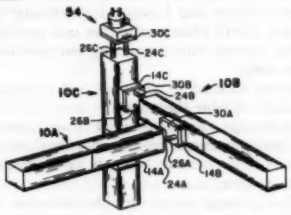
## CYLINDER DRIVEN RECIPROCATOR

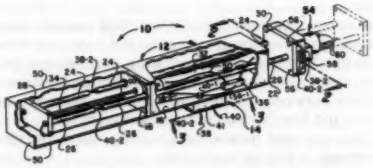
**Dale L. Connelly, Rte. 3, McAAP, Box 615B, McAlester, Okla. 74501**

**Filed May 5, 1983, Ser. No. 491,833**

**Int. Cl.**[3] **B66D** *1/08;* **F01B** *9/00*

**U.S. Cl. 92—137** **3 Claims**





1. A reciprocator comprising:

a vertical support,

a base upon which said support is mounted,

a lower pulley mounting plate and an upper pulley mounting plate on said support,

pulley mounts extending above and below both pulley mounting plates,

said pulley mounts extending above said upper pulley mounting plate and below one of said pulley mounts extending said lower pulley mounting plate supporting single pulleys thereon,

said vertical support including a trackway having a pair of U-shaped beams,

an output mounting block slidably mounted between said beams and between said single pulleys,

an extensible member mounted on said vertical support,

a moveable frame attached to said extensible member and moveable therewith,

said moveable frame having an upper row of pulleys and a lower row of pulleys thereon,

one of said pulley mounts extending below said upper pulley mounting plate and one of said pulley mounts extending above said lower pulley mounting plate having a plurality of pulleys mounted thereon,

a cable with ends attached to said upper and lower pulley mounting plates,

said cable being looped continuously around said pulleys on said moveable frame and on said upper and lower pulley mounts on said upper and lower pulley mounting plates,

said output mounting block being attached to said cable and moveable therewith upon actuation by movement of said extensible member.

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**4,516,479**

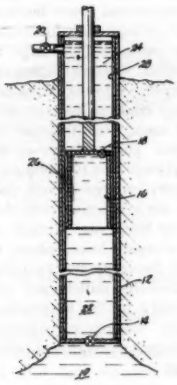
## PUMP

**Amnon F. Vadasz, Caracas, Venezuela, assignor to Intevep, S.A., Caracas, Venezuela**

**Filed Jun. 6, 1983, Ser. No. 501,650**

**Int. Cl.³ F16J** *10/04, 1/00*

**U.S. Cl. 92—170** **4 Claims**



**1.** In a reciprocating piston pump for pumping fluids which contain a high degree of suspended particles including a cylinder having a fluid inlet and a fluid outlet and a piston movable within said cylinder for pumping fluid from said fluid inlet to said fluid outlet, the improvement which comprises a hollow elongated metal piston having an exterior peripheral surface and a valve, a cylinder having an interior surface, a first cylindrical sleeve mounted over the exterior peripheral surface of said piston and a second cylindrical sleeve lining the interior surface of the cylinder wherein said first cylindrical sleeve and said second cylindrical sleeve are made of a hard ceramic material having a hardness of greater than nine on the Mho scale such that any suspended particles which lodge between said first cylindrical sleeve and said second cylindrical sleeve are pulverized as said piston moves within said cylinder.

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**4,516,480**

## PISTON RING FOR ENDOTHERMIC MOTORS HAVING AN IMPROVED FLAME DAMPER RING

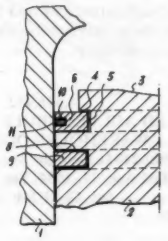
**Leopoldo Cattaneo, Via de Allesandri, 1, 20144 Milano, Italy**

**Continuation-in-part of Ser. No. 152,496, May 22, 1980, abandoned. This application Mar. 29, 1982, Ser. No. 363,041**

**Claims priority, application Italy, Jun. 1, 1979, 23193 A/79; Jun. 1, 1979, 23194 A/79**

**Int. Cl.³ F02F** *5/00;* **F16J** *9/08, 9/20*

**U.S. Cl. 92—182** **1 Claim**



**1.** A piston for an endothermic motor, comprising

at least one first piston ring groove for receiving a first compression ring,

a flame damper ring groove disposed between said first groove and a head of said piston,

a floating flame damper ring disposed with clearance in said flame damper ring groove,

at least one second groove provided on an outer surface of said flame damper ring in a radial direction thereof, and

a second compression ring of the split type having tips and disposed within said second groove to define a ring gap between said second compression ring and said flame damper ring in the radial direction thereof,

said second compression ring so disposed as not to close on the tips thereof when subjected to external pressure, and so disposed as to act on a surface of said second groove in a radial direction thereof when subjected to external pressure.

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**4,516,481**

## PISTON AND PISTON RINGS SET

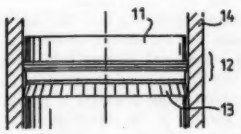
**Robert Geffroy, and Christophe Geffroy, both of 1 Blvd. Richard Wallace, Neuilly s/s Maillot 38-57, Paris, France**

**Filed Feb. 1, 1982, Ser. No. 344,732**

**Claims priority, application France, Feb. 6, 1981, 81 02353; Dec. 23, 1981, 81 24100; Jan. 15, 1982, 82 00625**

**Int. Cl.³ F16J** *1/04, 9/20, 15/32*

**U.S. Cl. 92—212** **33 Claims**



**1.** An assembly comprising a cylinder, for internal combustion engine or compressor, extending between a compression head and a crankcase, a piston, and piston rings set reciprocable within said cylinder characterized by an improved combination of compression ring and oil control ring means for

reducing friction, blow-by, and oil climbing, said means comprising: compression ring means in a piston groove coaxial with the cylinder adjacent the compression head end of said piston for minimizing blow-by from said compression head to said crankcase, and oil control ring means in a piston groove adjacent said compression ring means on the crankcase side constructed with acute conical elastic circular outer edge skirt means projecting uniformly from its piston groove for differentially scraping oil from the cylinder wall during the strokes of the piston toward said crankcase, and for bypassing oil on the cylinder wall by Kingsbury effect during strokes of the piston away from said crankcase, said skirt means comprising a plurality of separated metal blades projecting from an integral connecting portion of said oil control ring means, the composite free state circumference of said blades being greater than their operating circumference thereby providing said outward spring bias upon assembly.

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**4,516,482**

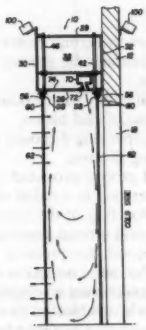
## CONDITIONED AIR VESTIBULE FOR REFRIGERATED WAREHOUSE DOORWAY

**George R. Smith, 21811 Georgia Ave., Brookeville, Md. 20792**

**Filed Apr. 24, 1984, Ser. No. 603,417**

**Int. Cl.³ F24F *9/00***

**U.S. Cl. 98—36** **15 Claims**



1. A conditioned air vestibule for controlling the flow of air through a door opening in a wall of a cold storage room and for reducing precipitation resulting from such air flow, said apparatus comprising,

a frame including a pair of laterally spaced vertically extending side panels and a top panel, said frame being adapted to be mounted in contact with the refrigerated room wall in surrounding relation to the door opening with said side panels extending outwardly from the wall one adjacent each side of the door opening, said side and top panels cooperating to define an open portal projecting from the wall,

first and second door panel means,

mounting means supporting said first and said second door panel means for movement between a closed position extending across and closing said portal and an open position, said first and said second door panel means in the closed position being disposed in parallel planes spaced from one another in the direction of travel through the door opening a distance no greater than about one half the distance between said side panels and cooperating with said frame to define a closed vestibule,

power means for substantially simultaneously moving said first and second door panel means between the open and closed positions,

air outlet means extend through said top panel, said air outlet means being adapted to direct air into said closed vestibule adjacent the top of one of said door panel means along at least a major portion of the length of said top panel,

air inlet opening means in said top panel for permitting escape of air from said closed vestibule,

blower means operatively connected with said air outlet means and said air inlet means for circulating air through said closed vestibule, and

heater means associated with said blower means for conditioning air in the closed vestibule to eliminate precipitation resulting from infiltration air and exfiltration air through the closed vestibule.

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**4,516,483**

## AIR BLOWING DEVICE

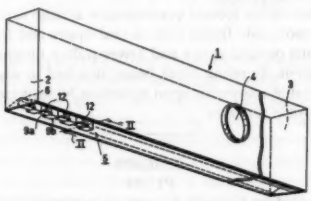
**Jakob Bosman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Mar. 21, 1983, Ser. No. 477,107**

**Claims priority, application Netherlands, Apr. 2, 1982, 8201410**

**Int. Cl.³ F24F *13/072***

**U.S. Cl. 98—40.14** **3 Claims**



1. An air-discharge device for incorporation in a ceiling, which comprises an elongate housing of substantially rectangular cross section, said housing having two longitudinal vertical sides, two vertical ends, a longitudinal upper horizontal side, and an open longitudinal lower horizontal side substantially flush with the ceiling, each longitudinal vertical side being formed with an elongate lower edge; an air inlet in said housing; two longitudinal walls extending obliquely into said housing from the respective lower edges of the longitudinal vertical sides, the inner edges of said two oblique walls defining a longitudinal air passage slot therebetween; a plurality of air-deflecting L-shaped guide blades extending lengthwise along said housing between said two oblique walls, said guide blades being alternately secured at one end of the vertical portion of the L to the respective two oblique walls, each guide blade having the horizontal portion of its L lying in a plane including the elongate lower edges, said guide blades thereby forming with the respective two oblique walls alternately directed air discharge outlets; and partitions arranged substantially transversely to the longitudinal extent of the housing between the respective adjacent guide blades, whereby the air discharged through said outlets flows substantially along the ceiling.

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**4,516,484**

## HOUSEHOLD APPLIANCE FOR PREPARING HOT BEVERAGES

**Luigi De Ponti, Milan, Italy, assignor to Alfonso Bialetti & C., Fonderia in Conchiglia S.p.A., Omegna-Crusinallo, Italy**

**Filed Mar. 23, 1984, Ser. No. 593,039**

**Claims priority, application Italy, Mar. 23, 1983, 21234/83[U]; Apr. 15, 1983, 21565/83[U]**

**Int. Cl.³ A47J *31/00***

**U.S. Cl. 99—279** **6 Claims**

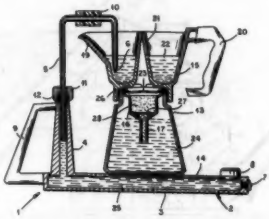
1. An appliance for the preparation of hot beverages, comprising:

a boiling chamber fillable with water for generating steam upon being exposed to a source of heat;

a receptacle remote from said boiling chamber adapted to contain a liquid to be separately heated;

conduit means extending from said boiling chamber and terminating in an outlet within said receptacle for emitting the generated steam into the liquid contained therein;

a vessel separated by thermally conductive wall means from said boiling chamber for indirectly heating liquid present



in said vessel, said receptacle being supported on a cover closing the top of said vessel, said boiling chamber being formed by a jacket spacedly surrounding at least a lower part of said vessel, said vessel being spaced above the bottom of said boiling chamber, said conduit means comprising a tube rising centrally within said vessel and penetrating said cover, said receptacle having a central nipple surrounding at least part of an upper end of said tube.

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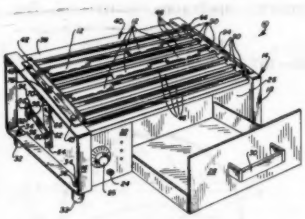
**4,516,485**

## DEVICE FOR COOKING FOOD

**Dye O. Miller, South Barrington, Ill., assignor to A. J. Antunes & Co., Addison, Ill.**

**Filed Jun. 29, 1981, Ser. No. 278,313**
**Int. Cl.³ A47J *37/04***
**U.S. Cl. 99—339** **8 Claims**



1. An apparatus for heating food items, comprising:

a housing,

an inclined platen mounted on said housing,

means for heating said platen,

a grid slideably positioned on said platen, said grid including a plurality of food item supports extending across said inclined platen, and

means for reciprocally sliding said grid up and down on said inclined platen.

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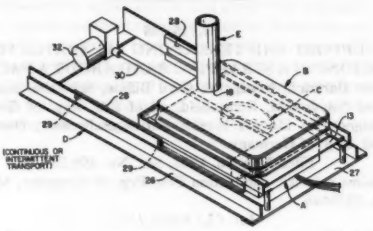
**4,516,486**

## COOKING APPARATUS AND METHOD

**William H. Burkhart, 225 Avalon Dr., Los Altos, Calif. 94022**

**Filed Jun. 20, 1983, Ser. No. 506,130**
**Int. Cl.³ A47J *37/00***
**U.S. Cl. 99—388** **12 Claims**

1. Apparatus for cooking meat or the like, comprising a cooking chamber having means for supporting the meat or the like therein, a source of radiant energy including a lamp and means for focusing energy from said lamp on a region of a surface of said meat or the like that is small relative to the area of said surface and for producing at that region an intense heat flux, said lamp having a filament capable of producing of the order of hundreds of watts per inch of filament length from a 120 volt AC supply, said lamp being located outside of said cooking chamber and said cooking chamber having a wall that is transmissive to said radiant energy and through which said




radiant energy is transmitted to said region, means for moving said source relative to said cooking chamber along said surface so as to move said region and so as to char at least portions of said surface so quickly that the interior of said meat or the like does not cook beyond a desired state, and means for the disposal of smoke generated in said cooking chamber.

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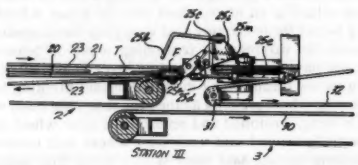
**4,516,487**

## APPARATUS FOR FOLDING A DOUGH SHEET TO ENCLOSE A FOODSTUFF FILLER

**David P. Madison, 409 Glenbrook Rd., Apt. E, Stamford, Conn. 06906, and Michael B. Cruver, 1408 Adams, Port Townsend, Wash. 98368**

**Filed May 5, 1982, Ser. No. 375,051**
**Int. Cl.³ A21C *9/00, 11/00***
**U.S. Cl. 99—450.6** **16 Claims**




1. In mechanism for folding a sheet wrapper around filling including generally horizontal conveyor means for transporting a sheet wrapper edgewise and having a discharge end roller rotatable about an axis extending transversely of the direction of movement of the conveyor means and means for rotating such discharge end roller continuously in one direction, the improvement comprising an auxiliary roller adjacent to and beyond the discharge end of the conveyor means, having its upper surface disposed at substantially the same elevation as the elevation of the discharge end of the conveyor means and rotatable about an axis substantially parallel to the axis of rotation of the conveyor discharge end roller, reversible drive means for driving said auxiliary roller alternatively in opposite directions, and control means for controlling said reversible drive means to drive said auxiliary roller in the same rotative direction as the conveyor discharge end roller rotation until a substantial portion of a wrapper delivered by the conveyor means has been transferred from the conveyor means onto said auxiliary roller, and for then reversing the direction of rotation of said reversible drive means for driving said auxiliary roller in the rotative direction opposite the direction of rotation of the conveyor discharge end roller for folding the wrapper between the conveyor discharge end roller and said auxiliary roller along a crease extending transversely of the direction of movement of the conveyor means and drawing the

wrapper and filling downward between such rollers in that folded condition, and said control means thereafter being operable to reverse the direction of rotation of said auxiliary roller to rotate again in the same direction as the direction of rotation of the conveyor discharge end roller to receive thereon the leading portion of the next sheet wrapper delivered by the conveyor means.

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**4,516,488**

## SUPPORT AND TENSIONING APPARATUS FOR TENSIONING A STRAPPING BAND ABOUT A PACKAGE

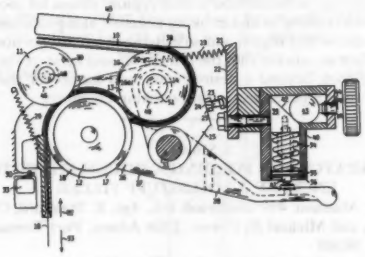
**Günter Bartzick, Ennepetal; Gerd Bühne, Schwelm, and Reinhard Naydowski, Remscheid, all of Fed. Rep. of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Fed. Rep. of Germany**

**Filed May 26, 1983, Ser. No. 498,259**

**Claims priority, application Fed. Rep. of Germany, May 29, 1982, 3220446**

**Int. Cl.³ B65B *13/22***

**U.S. Cl. 100—4** **19 Claims**



1. Support and tensioning apparatus for a strapping band to be tensioned around a package, comprising: a pair of wheels of which one wheel is an idler wheel and the other wheel is a tensioning wheel for tensioning said strapping band; tensioning motor means for driving said tensioning wheel in tensioning direction and having a shaft; a pivoting lever, said shaft of said tensioning motor means being mounted in said pivoting lever, said tensioning wheel pressing against the strapping band while the band is being tensioned and rests on the idler wheel and is looped partially around said tensioning wheel, said tensioning wheel pressing against said band with a force that increases with the tension in the band; a band guide surrounding said package without contacting said package, said band being first placed between said idler wheel and an advance and retraction wheel and advanced in said band guide and being subsequently retracted with its front end secured in place into a position against the package by reversing rotation of said pair of wheels, said band being thereafter tensioned with said tensioning wheel rotating substantially slowly and at high power, said tensioning wheel pressing against said band with a pressing force that increases with tension in said band when said band is being tensioned and contacts said idler wheel, frictional forces arising on the partially looped part of said tensioning wheel due to said pressing force being additive to said pressing force and being applied with said pressing force to said idler wheel.

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**4,516,489**

## APPARATUS FOR CRUSHING ARTICLES

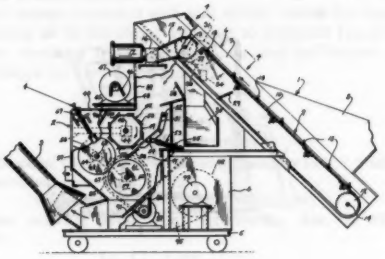
**James A. Ballo, Elm Grove, Wis., assignor to Balcon Industries, Menomonee Falls, Wis.**

**Filed Jun. 24, 1982, Ser. No. 391,581**

**Int. Cl.³ B30B *9/32***

**U.S. Cl. 100—98 R** **12 Claims**

1. An apparatus for crushing articles, comprising a housing, first stage crushing means disposed within the housing and disposed to receive and crush a plurality of said articles, second stage crushing means located within the housing to receive partially crushed articles from said first stage and to provide a secondary stage of crushing, delivery means for delivering the partially crushed articles from said first stage crushing means to the second stage crushing means, recirculating conduit means for conducting partially crushed articles from a location



between said first and second crushing means to a second location upstream of said first crushing means, and means associated with said first crushing means for moving said articles through said recirculation conduit means during periods when said second crushing means cannot accommodate the flow of partially crushed articles.

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**4,516,490**

## PRESS DRAINAGE

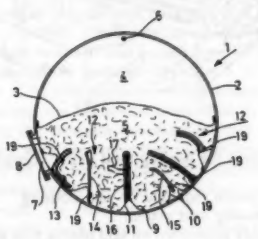
**Eduard Hartmann, Schneisingen, Switzerland, assignor to Bucher-Guyer AG, Niederweningen, Switzerland**

**Filed Nov. 8, 1983, Ser. No. 549,925**

**Claims priority, application Switzerland, Dec. 21, 1982, 7442/82**

**Int. Cl.³ B30B *9/06***

**U.S. Cl. 100—107** **19 Claims**



1. A press for extracting fluid from fluid-containing matter so as to separate the fluid from the remaining matter, particularly for dejuicing of agricultural products, primarily fruit,

comprising in combination a rotatably supported container,

at least one flexible membrane actuatable by pressure means, disposed in said container, and subdividing said container so as to define a pressure chamber and a press space therein,

at least one wall surrounding said press space,

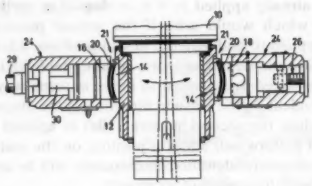
said pressure chamber having an inlet conduit and an outlet conduit for a pressure medium, and

a plurality of flexible drainage means, at least some of said drainage means having free ends, at least the remaining drainage means having ends connected to said wall, said flexible drainage means extending into said press space.

## 4,516,491
## ROLL CROSS-AXIS MECHANISM

William J. Winter, Trumbull, Conn., assignor to USM Corporation, Farmington, Conn.

Filed Sep. 30, 1983, Ser. No. 537,596
Int. Cl.³ B30B 3/04
U.S. Cl. 100—158 R 2 Claims



1. In a calender roll machine having a pair of opposed rolls one of which is mounted at opposite ends in journals which are adjustable in cross axis directions to compensate for roll bending, and also adjustable in directions toward and away from a cooperating roll, the improvement comprising semi-cylindrical anti-friction bearings at opposite sides of the journal between means for adjusting the journal in cross axis directions, and means between a slide and the journal for adjusting the journal and the one roll toward and away from the cooperating roll the slide being mounted in a frame by anti-friction linear bearings for permitting free floating movement of said one roll on the first named and second named bearings toward and away from the cooperating roll without affecting the cross-axis adjustment.

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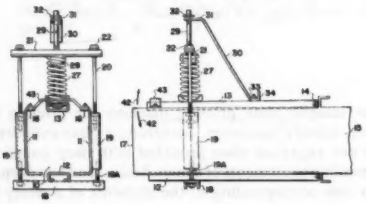
## 4,516,492
## BALE DISCHARGE PRESSURE PLATE

Abram J. Olfert, Box 7, Hague Saskatchewan, Canada (S0K 1X0)

Filed Oct. 7, 1983, Ser. No. 539,948
Claims priority, application Canada, Oct. 7, 1982, 413033
Int. Cl.³ B30B 9/30
U.S. Cl. 100—192 6 Claims



1. In a bale discharge chute which includes a pair of spaced and parallel vertical side walls, a lower member and an upper pressure beam pivoted by one end thereof adjacent the inlet end of the chute and extending towards the discharge end thereof between the upper edges of the vertical side walls and a pair of links extended between the chute and the beam for loading the beam said lines having upper ends; the improvement comprising an adjustable compression spring for preloading said beam and means mounting said compression spring from said chute whereby said compression spring reacts between said beam and said chute and normally urges said beam downwardly in a vertical arc around the pivotal connection thereof to said chute, said means mounting said compression spring upon said chute includes means operatively connecting the upper ends of the links together across the upper side of said chute and spaced upwardly from said beam, said compression spring reacting between said beam and said means connecting the upper ends of said links in order to pre-load said beam, and a compression spring locating member secured to said overspanning member and engaging within the upper end of said compression spring, a compression spring guiding bolt extending axially through said compression spring and freely through said locating member, an anchor plate at the base of said compression spring, the lower end of said bolt being secured to said anchor plate and securing plate means clamping said anchor plate to said pressure beam, a brace extending rearwardly between the upper end of said guide bolt and said pressure beam, means spanning said bale chamber forwardly of said overspanning member to limit the upward movement of said pressure beam and further means extending transversely of said pressure beam rearwardly of said overspanning member and engageable with the other side of said discharge chute to limit the downward movement of said beam.

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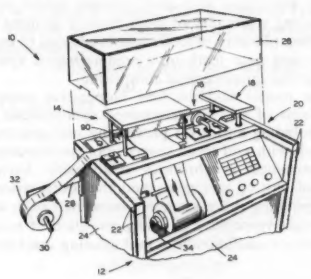
## 4,516,493
## APPARATUS FOR IMPRINTING AND CUTTING A TAPE OR RIBBON

Harold Schemenauer, 1943 Heatherwood Dr., Toledo, Ohio 43614

Continuation-in-part of Ser. No. 465,536, Feb. 10, 1983, abandoned. This application Mar. 8, 1984, Ser. No. 587,555
Int. Cl.³ B41F 17/00
U.S. Cl. 101—27 19 Claims



1. A tape imprinting apparatus comprising, in combination:

means for imprinting indicia on a tape including a printing assembly, means for providing heat to said printing assembly, a platen spaced from and parallel to said printing assembly, first means for reciprocably translating said printing assembly along an axis normal to said platen and into imprinting contact with a tape disposed on said platen;

first means for advancing the tape along a first axis including a first drive roller, a first idler roller and first means for rotating said first drive roller;

at least one pair of guide means having adjustable separation along an axis transverse to said first axis for guiding said tape along said first axis;

second means for advancing a printing foil generally along a second axis normal to said first axis including a second drive roller, a second idler roller and second means for unidirectionally rotating said second drive roller, means responsive to said imprinting means for cycling said second advancing means; and

means for cutting said tape including a first tape cutting mechanism having a first cutting pattern, a second cutting mechanism having a second cutting pattern, and means for selectively activating said first cutting mechanism or said first and said second cutting mechanisms to cut such tape according to said cutting patterns.

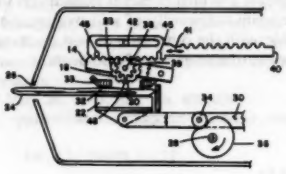
## 4,516,494
## ANTI THEFT DEVICE FOR A PRINTING MACHINE PRINT WHEEL ASSEMBLY

Christian A. Beck, Ridgefield, and Alton B. Eckert, Norwalk, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 459,427, Jan. 20, 1983, abandoned. This application Mar. 21, 1984, Ser. No. 591,891

Int. Cl.³ B41J 1/54

U.S. Cl. 101—93.26 6 Claims



6. In a printing machine having the capability of printing value indicia on material by means of a printing device having a plurality of selectively settable printing wheels mounted for rotation on a common axis and having a plurality of numerical printing members arranged around the periphery thereof, said printing device including means for setting said printing wheels, said setting means comprising a gear carried by each of said printing wheels on one side thereof and having a predetermined number of gear teeth, and a movable drive member operatively associated with each printing wheel, each drive member having a plurality of teeth thereon defining at least a corresponding plurality of tooth spaces adapted to engage and mesh with said gear teeth in a predetermined synchronous relationship, the improvement comprising:

means to render said machine inoperative responsive to alterations of said predetermined synchronous relationship including means for preventing said gear teeth from meshing with said tooth spaces upon an alteration in said predetermined synchronous relationship between the teeth of any of said gears and the tooth spaces of the corresponding drive members associated with said gears and means responsive to said prevention of meshing for indicating a malfunction in said printing machine.

## 4,516,495
## METHOD AND ARRANGEMENT FOR POSITIONING A SECOND PATTERN ORIGINATING FROM A PATTERN FORMED ON A STENCIL IN RELATION TO A MATERIAL INTENDED FOR THE PATTERN

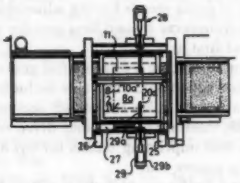
Sylve J. D. Ericsson, Tumba, Sweden, assignor to Svecia Silkscreen Maskiner AB, Norsborg, Sweden

Filed May 18, 1984, Ser. No. 611,629

Claims priority, application Sweden, May 18, 1983, 8302802; Mar. 20, 1984, 8401527

Int. Cl.³ B41F 1/34, 15/36; B41L 13/02

U.S. Cl. 101—129 25 Claims



1. Method for positioning a second pattern (10*a*) originating from a first pattern (1*a*) formed on a stencil in relation to a material (8) intended for the pattern, with said second pattern (10*a*) being formed by causing a coating intended for the material to pass through the first pattern, for example by means of a scraper blade in a silk screen printing machine, characterized in that the position of the second pattern (10*a*) relative to a reference point, usually the frame components of the printing machine, is stored in an organ, and in that when a material to which the second pattern (10*a*) is to be transferred has been moved into a printing position, the position of the material or of a pattern already applied to it is evaluated as well as any discrepancy which would arise if the second pattern (10*a*) were to be applied to said material in said position, whereupon a frame holding the stencil and/or a printing table and/or the material is displaced or is caused to move in some way into a position dependent on the size and direction of the discrepancy such that, when the second pattern (10*a*) is applied to the material, said pattern will adopt a position on the material in which any previously identified discrepancy will be compensated for fully or to a satisfactory extent.

## 4,516,496
## COPPERPLATE ENGRAVING MACHINE FOR PRINTING PAPER CURRENCY

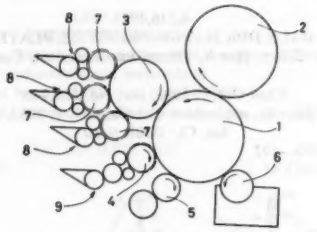
Gualtiero Giori, Lonay, Switzerland, assignor to De La Rue Giori S.A., Switzerland

Filed Mar. 18, 1983, Ser. No. 476,539

Claims priority, application Switzerland, Apr. 7, 1982, 2150/82

Int. Cl.³ B41F 9/02

U.S. Cl. 101—152 1 Claim

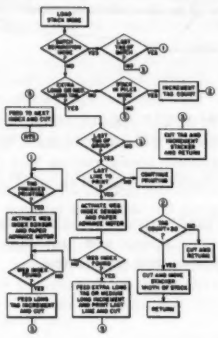


1. An intaglio plate printing machine for printing paper currency, notably banknotes, compriing a plate cylinder with at least one engraved plate provided with deep intaglio cuts corresponding to elements of a main design, and less deep, finer intaglio cuts corresponding to the elements of a safety background, an impression cylinder cooperating with and contiguous to a surface of the plate cylinder, at least one selector inking roller of an inking unit having a resilient surface with relief cuts therein and cooperating directly with said plate for inking the cuts corresponding to the main design, a plate wiping system contiguous to a surface of the engraved plate together with an inking system for inking the cuts corresponding to the safety background with at least two different colors, wherein said inking system for inking the cuts corresponding to the safety background elements consists of a collector cylinder having a smooth resilient surface cooperating with the engraved plate, said collector cylinder being located, in the direction of rotation of the plate cylinder, ahead of said selector inking roller and being in contact at its periphery with at least two hard color selector cylinders for different colors of the safety background which are formed with relief areas corresponding to the respective colored areas of the safety background, and an inking supply device being associated with each color selector cylinder.

## 4,516,497
## PRINTER WITH AUTOMATIC STACKER

Frederick M. Pou, Dayton, and Richard L. Straub, Miamisburg, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 393,674, Jun. 30, 1982, Pat. No. 4,442,774.
This application Mar. 26, 1984, Ser. No. 575,942
Int. Cl.³ B41F *13/64*
U.S. Cl. 101—240 7 Claims



1. A stacker for stacking batches of tags issuing from a printer comprising:

means including a conveyor for receiving said tags;

means for counting the number of tags placed on said conveyor;

means for determining the number and width of the tags present in each batch; and

means responsive to said counting means and to said number and width determining means for advancing said conveyor an increment that is a predetermined amount greater than the width of the tags in the batch after a predetermined number of tags have been printed or after the end of a batch has been reached, said increment being determined by the width of the tags in the batch being printed.

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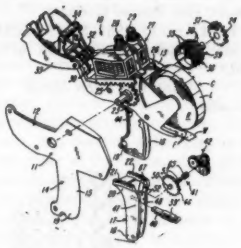
## 4,516,498
## HAND-HELD LABELER AND LABELING METHOD

John D. Mistyurik, Tipp City, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Division of Ser. No. 416,196, Sep. 9, 1982, which is a continuation of Ser. No. 243,100, Mar. 12, 1981, abandoned.
This application Sep. 30, 1982, Ser. No. 430,085
Int. Cl.³ B41K *5/08*
U.S. Cl. 101—288 16 Claims

1. A hand-held labeler for printing and applying labels releasably secured to a carrier web, comprising: a housing having a handle, a manually operable actuator disposed at the handle and movable from an initial position, to an actuated position, and again to its initial position, a platen, a print head cooperable with the platen, an inking member for inking the print head, means for delaminating printed labels, means for applying printed labels, a drive member engageable with the carrier web for advancing the carrier web, means coupled to the actuator for moving the print head and for moving the drive member through a cycle of operation to print and dispense labels one at a time into label applying relationship with



respect to the label applying means, and means for blocking return of the actuator to prevent operation of the moving means.

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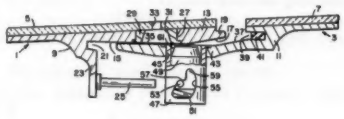
## 4,516,499
## QUICK ACCESS SPLICE FOR MISSILE SECTIONS

Ralph A. Eyman, Clermont, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 30, 1983, Ser. No. 509,577
Int. Cl.³ F42B *13/00*
U.S. Cl. 102—293 5 Claims



1. Forward and aft mating missile sections having a quick access splice, comprising cylindrical telescoping ring structures on the forward and aft sections, said forward section having a conically tapered cutout surface in said cylindrical ring structure and a trigger member mounted thereon, said aft structure having a pin with a conically tapered front surface and being held in a retracted position by latch means and a spring means biasing said pin radially outwardly for engagement of said front tapered surface on said pin with the conically tapered surface on said forward member, said trigger member being positioned relative to said latch means for said pin such that said trigger member releases said latch means as said forward and aft members are telescoped together to allow said spring means to bias said pin into engagement with said conically tapered surface of said forward member and provide a shear surface connecting means between said forward and aft structures for securing these members together.

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## 4,516,500
## Patent Not Issued For This Number

**4,516,501**

## AMMUNITION CONSTRUCTION WITH SELECTION MEANS FOR CONTROLLING FRAGMENTATION SIZE

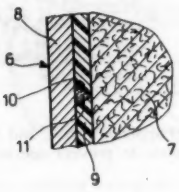
**Manfred Held, Aresing, and Peter Grössler, Hockstadt, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Fed. Rep. of Germany**

**Filed Apr. 13, 1981, Ser. No. 253,552**

**Claims priority, application Fed. Rep. of Germany, May 2, 1980, 3016861**

**Int. Cl.³ F42B *13/18***

**U.S. Cl. 102—496** **15 Claims**




1. Ammunition, such as a warhead, comprising:

a casing defining a space;

an explosive charge within said space;

elongated casing dividing means extending in a pattern between said casing and said explosive charge for fragmenting said casing along said casing dividing means with said casing dividing means in an operable condition; and

selection means associated with said elongated casing dividing means for placing only selected portions of but not all of, said elongated casing dividing means in an inoperable condition to change the size for fragments of the casing to be formed upon explosion of the explosive charge and operation of a remaining operable portion of said elongated casing dividing means.

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**4,516,502**

## IMPACT PROJECTILE ASSEMBLY

**Klaus-Walter Klein, Neuss; Jürgen Böcker, Oberhausen; Gerhard Glotz, Düsseldorf, and Klaus Gersbach, Willich, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany**

**Filed Feb. 1, 1983, Ser. No. 462,902**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1982, 3207220**

**Int. Cl.³ F42B *13/16***

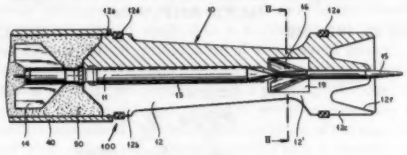
**U.S. Cl. 102—523** **6 Claims**

1. A subcaliber projectile assembly for firing from a barrel-type weapon to attack a multilayer armored target, comprising:

an elongated sabot comprising a plurality of axially extending segments separable along axial planes, said segments defining a recess close to a leading air-catching end of the sabot;

a relatively small inertial enabling projectile received in said end of said sabot and having a fin stabilizer received in said recess;

a relatively large main inertial subsequently attacking projectile received in said sabot behind said enabling projectile and having a fin stabilizer disposed rearwardly of said sabot, said segments and the periphery of said main projectile being formed with mating formations enabling



entrainment of said main projectile with said sabot until said segments of said sabot separate, said projectiles having aerodynamic configurations such that said enabling projectile reaches said target ahead of said main projectile; and

at least one band surrounding said segments for releasably retaining same against said projectiles and holding said formations in mutual engagement.

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**4,516,503**

## MACHINE FOR REPLACING RAILWAY SWITCHES AND TRACKS

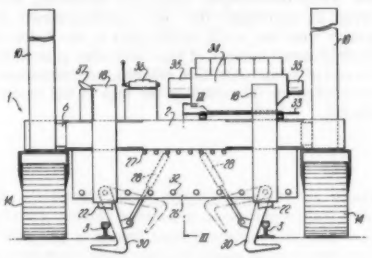
**Pietro Boccaletti, Reggio Emilia, Italy, assignor to AMECA S.r.l., Cavriago, Italy**

**Filed May 18, 1982, Ser. No. 379,357**

**Claims priority, application Italy, May 22, 1981, 46846 A/81**

**Int. Cl.³ E01B *29/02***

**U.S. Cl. 104—3** **5 Claims**



1. Railway maintenance apparatus for replacing railway switches and track portions comprising,

a rigid platform,

four flanged wheels for engagement with tracks of a railway to transport the apparatus on the railway,

means mounting two of said wheels at each side of said platform, in spaced apart relation to each other, for downward extension and upward retraction relative to said platform,

motor means connected to said platform for extending and retracting said flanged wheels,

first and second crawler tracks at opposite sides respectively of said platform,

first means mounting said first crawler track on said platform for straight line generally horizontal movement between a retracted position adjacent one side of said platform and an extended position spaced from said one side of the platform,

first cylinder means on said platform for moving said first

crawler track between said extended and retracted positions,

second means mounting said second crawler track on said platform for straight line generally horizontal movement between a retracted position adjacent the other side of said platform and an extended position spaced from said other side of the platform,

second cylinder means on said platform for moving said second crawler track between said extended and retracted positions,

said straight line movement of the first crawler track being parallel to the straight line movement of the second crawler track,

means mounting said first crawler track on said first mounting means for generally vertical movement between an upper retracted position adjacent said first mounting means, and a lowered extended position spaced below said first mounting means for travel on a ballast at one side of a railway,

means mounting said second crawler track on said second mounting means for generally vertical movement between an upper retracted position and a lowered extended position spaced below said second mounting means for travel on a ballast at the other side of the railway,

plural hooks pivotally mounted on said platform for hooking onto a railway track portion and for lifting the track portion upon movement of said crawler tracks to said lowered extended positions, and

said first and second cylinder means comprising means for shifting said platform laterally of said crawler tracks when said crawler tracks are vertically and horizontally extended for travel on the ballast, to enable accurate lateral positioning of a railway track portion supported between said crawler tracks by said hooks.

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**4,516,504**

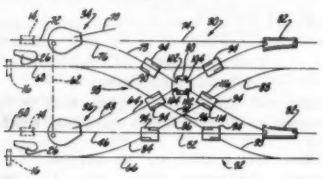
## CROSS-OVER TRACK STRUCTURE FOR WHEELED PALLETS

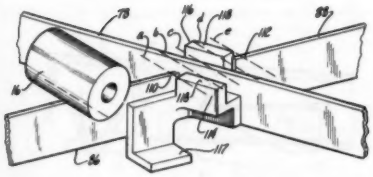
**John H. Brems, Boca Raton, Fla., and John L. Vaphiadis, Troy, Mich., assignors to Lamb Technicon Corp., Warren, Mich.**

**Filed Apr. 1, 1983, Ser. No. 481,344**

**Int. Cl.³ E01B** *7/10, 7/28*

**U.S. Cl. 104—130** **7 Claims**





1. A gravity conveyor system for pallets of the type having a pair of downwardly inclined tracks which cross one another at an intersection, each crossing track comprising a pair of generally parallel laterally-spaced upright rails, the upper edges of the rails being generally coplanar adjacent said intersection, characterized in that each pallet is provided at one side thereof with a pair of peripherally grooved wheels adapted to ride on the upper edge on one of said rails of each track to guide the pallet along the track and with a straight cylindrical roller on its opposite side adapted to ride on the upper edge of the other rail in each track, the intersecting wheel engaging rails of the two tracks being interconnected by a frog, each wheel engaging rail being interrupted at said frog, said frog having a pair of intersecting guideways interconnecting the adjacent ends of the interrupted rail, each guideway having a bottom wall and a pair of side walls, the bottom walls of the guideways being coplanar, the side walls of each guideway being spaced apart transversely to accommodate the passage of the wheels therebetween, said bottom walls lying in a plane generally parallel to the plane of the upper edges of the portions of the rails adjacent the frog and being spaced below said upper edges a distance corresponding to the depth of the groove in said wheels, the intersections between the wheel engaging and the roller engaging rails of the two tracks being interconnected by a cross-over member, said wheel engaging rail having a section extending through said cross-over member, a pair of coplanar pads spaced laterally from said rail section on opposite sides thereof to permit a grooved wheel on said wheel engaging rail to roll therebetween, the roller engaging rail at the cross-over member being interrupted between said pads to form a gap defined by two spaced apart rail ends, said pads extending transversely of the spaced ends of the interrupted roller engaging rail, said pads being generally coplanar with the upper edges of said rail section and the spaced ends of the interrupted roller engaging rail, said pads having a length relative to the length of the roller and the included angle between the crossing rails such that when a roller on one of the pallets rolls off one of the spaced apart ends of the interrupted roller engaging rail and onto the other end thereof, the pads and said section of the wheel engaging rail provide a continuous support surface for the roller which prevents the roller from dropping into said gap.

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**4,516,505**

## VEHICLE WHICH CAN BE HELD ON A ROADWAY WITH THE AID OF AN ATTRACTING MAGNETIC DEVICE

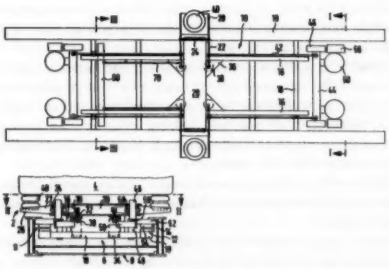
**Götz Heidelberg, Am Hügel 16, D-8136 Percha, Fed. Rep. of Germany**

**Filed Feb. 18, 1982, Ser. No. 350,097**

**Claims priority, application Fed. Rep. of Germany, Feb. 26, 1981, 3107341**

**Int. Cl.³ B61B** *13/08*

**U.S. Cl. 104—284** **12 Claims**



1. A system operating at least partly by magnetic attraction for maintaining a vehicle in spaced relation to a track, said system comprising:

a track,

a vehicle, said vehicle including a support part, a payload carrier, and spring means joining said support part and said payload carrier, said payload carrier being movable relative to said support part by deformation of said spring

means and said spring means including at least one spring arrangement having a first spring element and a second spring element sequentially connected with said first spring element;

attracting magnetic means for providing a magnetic force and for supporting said vehicle relative to said track, said attracting magnetic means including a first part mounted on said track and a second part mounted on the support part of said vehicle so as to be opposite said first part and to leave a free gap therebetween;

position-defining means mounted on said support part and guided at a substantially constant spacing from said track; and

coupling means mounted on said support part for providing a connection between said position-defining means and said second spring element for continuously detecting a variation of the load of said vehicle exerted on said second spring element and for converting such variation into a shift of said support part relative to said position-defining means thereby altering the width of said gap between said first and second parts for varying the magnetic force of said magnetic means and adapting such force to the load of said vehicle.

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**4,516,506**

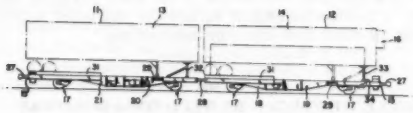
**ARTICULATED INTERMODAL FLATCAR**

**H. Neil Paton, 1218 Third Ave., Suite 1022, Seattle, Wash. 98101**

**Filed Jul. 13, 1981, Ser. No. 283,007**

**Int. Cl.³ B23P *6/00*; B61D *3/12, 17/04***

**U.S. Cl. 105—3** **30 Claims**



**1**. At least one short railway car unit manufactured by converting a long railway car having a center beam structure and a deck according to a process comprising the steps of:

(a) transversely severing said long railway car to form at least one car section having a center beam structure and a deck;

(b) removing portions of the center beam structure of said at least one section adjacent the end that severance was effected;

(c) removing portions of the deck of said at least one section between its ends to form a reduced section of decreased weight but having at least the combined load strength of said long railway car; and

(d) mounting a truck to said at least one reduced section adjacent the removed center beam portions of said at least one section to form at least one short railway car unit.

**16**. A method of converting a long railway car having a center beam structure and a deck into at least one short railway car unit, comprising the steps of:

(a) transversely severing said long railway car to form at least one short car section having a center beam structure and a deck;

(b) removing portions of the center beam structure of said at least one section adjacent the end at which severance was effected to provide truck clearance;

(c) removing portions of the deck of said at least one section between its ends to decrease the weight of said at least one section while retaining at least the combined load strength of said long railway car; and

(d) mounting at least one truck to said at least one section adjacent to the removed center beam structure portions to form at least one short railway car unit.

**4,516,507**

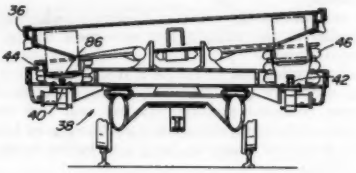
**MECHANICAL STOP MECHANISM FOR A TILT SYSTEM IN A RAILWAY CAR**

**Walter C. Dean, II, Collegeville, Pa., assignor to The Budd Company, Troy, Mich.**

**Filed Aug. 23, 1982, Ser. No. 410,235**

**Int. Cl.³ B61F *3/08***

**U.S. Cl. 105—199 A** **1 Claim**




**1**. In combination with a tilting system for a railway car body disposed on a truck, a pair of stop mechanisms connected to said truck to limit tilting of said car, each of said stop mechanisms being disposed towards opposite sides of said car body and comprising:

(a) a main housing for each of said pair of stop mechanisms:

(b) a shaft member disposed in said housing for engaging the bottom portion of said car to limit the downward movement of said car body;

(c) a movable block element extending below and in contact with said shaft member;

(d) a piston connected to said movable block element;

(e) biasing spring means normally biasing said block element in an extended position below said shaft member to prevent downward movement of said shaft member; and

(f) means for selectively applying pressure to move said piston to overcome the bias of said biasing means to cause said block element to be retracted from a position below said shaft member to permit free downward movement of said shaft member thereby permitting tilting of said car, and

(g) a second spring connected to bias said shaft member normally upwardly to continuously engage the bottom portion of said car body.

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**4,516,508**

**DESK APPARATUS**

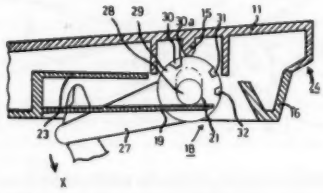
**Mitumasa Kako, and Michifumi Ishigami, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

**Filed May 4, 1983, Ser. No. 491,559**

**Claims priority, application Japan, May 11, 1982, 57-68571[U]**

**Int. Cl.³ A47F *5/12***

**U.S. Cl. 108—7** **6 Claims**




**1**. An angle adjusting mechanism for use in selectively adjusting the angle of inclination of a work surface and disposed between said work surface and a base, said mechanism comprising

a casing comprising a lower casing and an upper casing, with a pair of elliptical holes formed on opposite side walls of said casing and in the area of the boundary between said upper casing and lower casing, said upper casing being attachable to said work surface and said lower casing being contactable with said base in a level position of said work surface;

a foot device positioned within said casing and comprising a cylindrical portion having a plurality of channels in the periphery thereof, a pair of shafts extending from both ends of said cylindrical portion, and a foot member extending from said periphery of said cylindrical portion and having an end thereof contactable with said base in inclined positions of said work surface;

an engaging member positioned within and attachable to said upper casing and above said cylindrical portion within contactable distance to said plurality of channels in said cylinder portion to determine the distance between the base and the work surface dependent on the particular one of said plurality of channels to which said engaging member is engaged, said distance determining said angle of inclination of said work surface; and

resilient means for urging said cylindrical member against said engaging means,

wherein said shafts are positioned within said elliptical holes to be rotatable and vertically movable therein so that in a level locked position of said work surface, said foot member is within the casing and said lower casing contacts said base, and the engaging member is engaged with one of said plurality of channels on the periphery of the cylindrical member, and so that in said inclined positions of said work surface the foot member is manually rotated outside of the casing and against the resilient force of said resilient means to disengage the engaging member from said one or other of said plurality of channels, until the cylindrical member presents another selected channel for engagement and said selected other channel is engaged by the engaging member with said foot member having said end portion thereof thereupon resting on said base at a selected distance from said work surface.

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## 4,516,509
## OFFICE FURNITURE WITH AN ADJUSTABLE TABLETOP IN MODULAR DESIGN FOR SETUP AT THE WORK PLACE

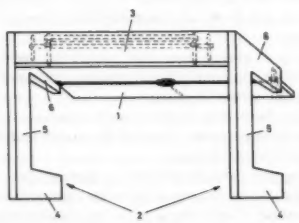
**Urs Langenegger, Uznach; Werner Roffler, Hinwil, and Wendolin Rütsche, Ruti, all of Switzerland, assignors to Embru-Werke, Mantel & Cie., Ruti, Switzerland**

**Filed Jun. 23, 1982, Ser. No. 391,148**

**Claims priority, application Fed. Rep. of Germany, Jun. 24, 1981, 3124658; Jun. 24, 1981, 3124660**

**Int. Cl.³ A47B 9/00**

**U.S. Cl. 108—147** **8 Claims**



1. Furniture in modular design for setup at the work place, such that the modular unit has a framework which consists of two side parts each having a hollow side arm and a hollow connecting beam with a tabletop held adjustably in the framework, characterized by the fact that there is at least one bolt (27) at the rear edge of the tabletop (1) such that the projecting end of the bolt (27) fits into a vertical slit (29) of the hollow beam (3) which connects the two hollow side arms (6) of the modular furniture unit, and at least one vertical adjusting spindle (32), which has a follower nut (31), housed inside the beam (3) for vertical movement of the bolt (27) which connects with the nut (31) and thus permits vertical adjustment of the tabletop (1), and further characterized by the fact that two operating rods (10) which can be shifted equally in longitudinal direction are located in the front area of the tabletop (1) and each of their outer ends fits in one side arm (6) of the furniture, a wedge element (21) which tapers toward the top is located in each side arm (6) and has a bolt head (23) of the corresponding operating rod (10) resting on its wedge surface (22), the horizontal distance (25') between the wedge surfaces increases steadily toward the bottom, there is an adjusting mechanism (13,14,17,18) to achieve the movement of the operating rods (10) for the purpose of changing the distance (25') between the two bolt heads (23) so that each bolt head spacing (25') corresponds to a different height position of the front part of the tabletop (1).

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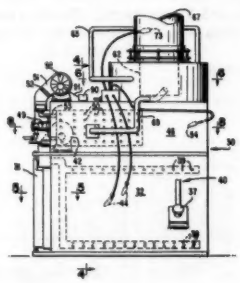
## 4,516,510
## INCINERATOR WITH TWO REBURN STAGES AND, OPTIONALLY, HEAT RECOVERY

**John N. Basic, Sr., 41 W. 202 Whitney Rd., St. Charles, Ill. 60174**

**Division of Ser. No. 248,054, Mar. 27, 1981, Pat. No. 4,438,705. This application Mar. 26, 1984, Ser. No. 573,429**

**Int. Cl.³ F23G 7/06**

**U.S. Cl. 110—346** **38 Claims**



1. A method of incinerating refuse which comprises:

(A) placing bulk refuse through a first inlet opening into a main incinerator chamber;

(B) burning said bulk refuse to produce gaseous combustion products;

(C) passing the gaseous combustion products out of said main combustion chamber through a first outlet opening and directly into a second inlet opening of a first reburn chamber;

(D) measuring a first temperature within or in near proximity to the interior of said first reburn chamber;

(E) burning, in said first chamber and in proximity to said second inlet opening, an amount of fuel, said amount of fuel being a first amount when said first temperature is above a first predetermined set point and a second amount when said first temperature is below a second predetermined set point which is not higher than said first set point, said first amount being less than said second amount;

(F) measuring a second temperature within or in near proximity to the interior of said first reburn chamber;

(G) introducing an amount of an oxygen-containing gas into said first reburn chamber through a plurality of jets extending at least about half the distance from said second inlet opening to a second outlet opening through which the gaseous combustion products can egress from said first

reburn chamber, said amount of said oxygen-containing gas introduced into said first chamber being a third amount when said second temperature is above a third predetermined set point and a fourth amount when said second temperature is below said third set point, said third amount being greater than said fourth amount;

(H) passing the gaseous combustion products out of said first reburn chamber through said second outlet opening and directly through a third inlet opening into a second reburn chamber;

(I) measuring a third temperature within or in near proximity of the interior of said second reburn chamber;

(J) introducing an amount of an oxygen-containing gas into said second reburn chamber through a plurality of jets extending at least about half the distance from said third inlet opening to a third outlet opening through which the gaseous products of combustion can egress from said second reburn chamber, said amount of said oxygen-containing gas introduced into said second chamber being a fifth amount when said third temperature is above a fourth predetermined set point and a sixth amount when said third temperature is below said fourth set point, said fifth amount being greater than said sixth amount.

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**4,516,511**

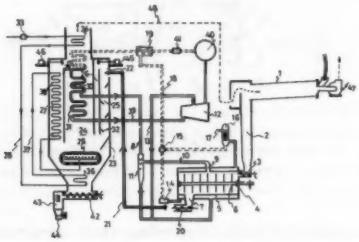
**REFUSE INCINERATION SYSTEM**

**Tsung H. Kuo, 465 Yuong An St., Cha-Yi, Taiwan**

**Filed Apr. 6, 1984, Ser. No. 597,256**

**Int. Cl.³ F23G *5/04***

**U.S. Cl. 110—346** **10 Claims**



**1**. A method of refuse incineration comprising the step of drying wet refuse before passing the latter to a boiler adapted to generate high-pressure superheated steam for producing mechanical work in an expander, wherein, in said drying step, the wet refuse is heated in a dryer by a heating medium in order to vaporize most of the moisture contained in said wet refuse to produce vapor, and recovering said vapoer and confining it into said heating medium.

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**4,516,512**

**MODULARIZED CARDAN SEWING MACHINE**

**Benjamin T. Bernstein, Highland Park; Thomas J. Bock, Schaumburg; George M. Toman, Chicago, and Chandrakant Bhatia, Buffalo Grove, all of Ill., assignors to Union Special Corporation, Chicago, Ill.**

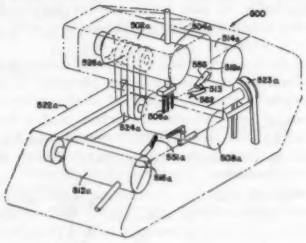
**Filed May 9, 1978, Ser. No. 904,205**

**Int. Cl.³ D05B *1/10, 57/32, 61/00***

**U.S. Cl. 112—165** **15 Claims**

**1**. A sewing machine adapted to create stitches comprising:

a Cardan gear driven needle module means driving at least one needle means; and



at least one Cardan gear driven looper module means driving looper means for cooperating with said needle module means.

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**4,516,513**

**METHOD AND APPARATUS FOR APPLYING A PATCH TO MANUFACTURED GOODS**

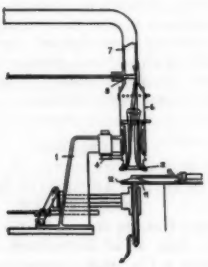
**Vinicio Gazzarrini, Florence, Italy, assignor to Solis S.r.l., Florence, Italy**

**Division of Ser. No. 107,426, Dec. 26, 1979,. This application Mar. 29, 1982, Ser. No. 362,974**

**Claims priority, application Italy, Jan. 9, 1979, 9311 A/79**

**Int. Cl.³ D05B *1/00, 97/00***

**U.S. Cl. 112—262.2** **20 Claims**



**1**. A method for applying a gusset to tubular articles such as women's pantyhose, comprising the steps of:

arranging the pantyhose across a hollow support with the edge of the seamless fabric stretched along the horizontal contour of a closed loop;

reversing the body of the pantyhose through the hollow support;

arranging a gusset over the pantyhose, which gusset is shaped to conform to the closed loop shape of the support;

holding the gusset in place;

trimming the excess fabric from the gusset;

sewing the superposed edges of the gusset and the stretched zone of the pantyhose;

removing the pantyhose from the device; and,

reversing the pantyhose to be in its right side out position.

**6**. A method of applying a gusset to tubular articles such as women's pantyhose, comprising the steps of:

arranging a pantyhose with an unsewn crotch zone across a hollow support with an edge of the unsewn crotch zone stretched along a horizontal contour of a closed loop;

reversing the body of the pantyhose through the hollow support to move substantially the entire portion of the pantyhose into the hollow support just leaving the edge of the unsewn crotch zone exposed;

arranging a gusset having an outer edge over the unsewn crotch zone;

holding the gusset in place;

trimming excess fabric from the gusset; and

sewing the superimposed edges of the gusset and the crotch zone of the pantyhose.

**14**. A method of applying a gusset to tubular outer articles such as pantyhose which have a seamless crotch zone between legs with each leg terminating in a toe section; comprising:

stretching and fastening the edge of said seamless crotch zone on the horizontal edge of an upper tubular support duct provided with suction means so that said pantyhose is in a hanging position relative to said support;

pneumatically turning the body of said pantyhose over and introducing therein the legs thereof with said toe sections in said upper tubular support;

holding said toe sections in said upper support;

mechanically placing a circular gusset on a lower horizontal circular support duct having suction means;

mechanically laying said support with said gusset thereon against said upper support so that the edge of the gusset is pressed and held fixed in juxtaposition to the stretched edge of said seamless zone of said pantyhose;

trimming excess fabric beyond the seam line of said pantyhose and said gusset;

sewing said gusset to said pantyhose; and

while said pantyhose is still being held by said toe section and said upper support, allowing said pantyhose to fall down right side out into said lower tubular support and removing said pantyhose from said lower support.

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**4,516,514**

## CIRCUIT ARRANGEMENT FOR CONTROLLING SEWING MACHINE SPEED AND FOR POSITIONING SEWING NEEDLE

**Shigeo Neki; Nozomu Shinozaki, and Takeshi Morofuji, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Sep. 23, 1983, Ser. No. 535,287**

**Claims priority, application Japan, Sep. 25, 1982, 57-166923; Sep. 25, 1982, 57-166926; Sep. 25, 1982, 57-166927**

**Int. Cl.[3] D05B** *69/26*

**U.S. Cl. 112—275** **12 Claims**

**1**. A circuit arrangement for controlling the operational speed of a sewing machine and for positioning a sewing needle at one or more predetermined resting position, comprising:

(a) first means for producing a first signal indicative of the rotational speed of an arm shaft operatively connected to said sewing needle for driving the same;

(b) second means for producing a second signal when said sewing needle is at said predetermined resting position or positions;

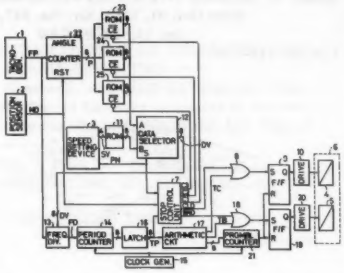
(c) third means responsive to said first and second signals for producing a third signal indicative of the rotational angle of said arm shaft from a reference position;

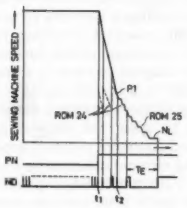
(d) fourth means having a manually operable member for producing a fourth signal indicative of first speed setting data in accordance with the user's choice, and a fifth signal when said manually operable member is positioned at a predetermined position;

(e) fifth means responsive to said third signal for producing a sixth signal indicative of second speed setting data in such a manner that the greater the rotational angle, the smaller the second speed setting data;

(f) sixth means for selecting said fourth signal in the absence of said fifth signal, and said sixth signal in the presence of said fifth signal;

(g) seventh means responsive to said first signal, second signal, fifth signal, and an output signal from said sixth means for producing a speed control signal; and




(h) eighth means responsive to said speed control signal for controlling the rotational speed and damping operation of said arm shaft.

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**4,516,515**

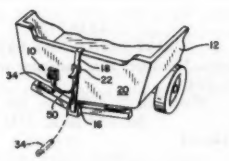
## BOAT PLUG REMINDER AND METHOD FOR USE THEREOF

**David A. Johnson, Salem, Oreg., assignor to J.F.S., Inc., Salem, Oreg.**

**Filed May 19, 1983, Ser. No. 496,172**

**Int. Cl.[3] B63B** *13/00*

**U.S. Cl. 114—197** **11 Claims**




**9**. A method for reminding a boat user to replace a boat plug in a drain hole of a boat before launching the boat, comprising:

(a) mounting a storage receptacle for a boat plug on in a boat;

(b) connecting a reminder flag movably to a portion of an apparatus used to support the boat while it is out of the water;

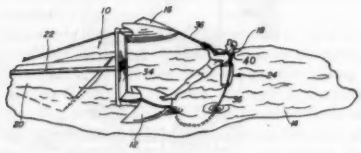
(d) attaching said reminder flag to said storage receptacle by installing the boat plug of the boat in the storage receptacle in a manner which requires the boat plug to be at least loosened therefrom in order to detach the reminder flag from the storage receptacle.

**4,516,516**

## BALLAST APPARATUS FOR RIGHTING A CAPSIZED BOAT

**Robert W. Methven, 2991 S. Ivory Ct., Aurora, Colo. 80013**

**Filed Oct. 31, 1983, Ser. No. 547,332**
**Int. Cl.³ B63H** *9/04*
**U.S. Cl. 114—39** **8 Claims**



**1.** Ballast apparatus for aiding in righting a capsized boat, comprising:

container means for holding a quantity of water as ballast, said container means being formed of flexible sheet material and changeable between an open condition for receiving and holding a quantity of water as ballast and a relatively flat, compact condition for stowage while not in use, said container means further including a collapsible sidewall adapted to open at an upper end and closed at a lower end by a bottom wall;

a stiffening element around a periphery of said bottom wall tending to open said sidewall around said bottom wall when said container means is deployed into the water, said stiffening element comprising a continuous pocket formed around a peripheral edge of said bottom wall containing flowable particulate material denser than water for submerging a lower end of said container means when deployed into the water,

said container means further including stiffening ring means around said upper end of said sidewall ready to receive water for ballast when said container means is deployed in the water, said stiffening ring means comprising a plurality of relatively stiff, but flexible, hollow elongated elements aligned end to end forming a generally circular, floatable, hollow stiffener ring extending around said open end of said container, said hollow elongated elements comprising hollow tubes of flexible material pivotally interconnected together at adjacent ends thereof by elongated flexible elements projecting into the hollow interior thereof; and

support means for securing said container of water to a person outwardly of said boat for exerting a righting moment thereon comprising shoulder strap means secured to said container means adjacent an upper level thereon for supporting the same from a persons shoulders.

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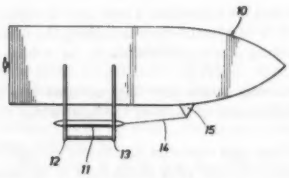
**4,516,517**

## FLOAT RECOVERY SYSTEM

**Ray R. Ayers, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed Jul. 21, 1983, Ser. No. 516,158**
**Int. Cl.³ B63C** *7/16*
**U.S. Cl. 114—51** **14 Claims**



**1.** A method for positioning a towed body for retrieval from the water to onboard a towing ship which is underway, comprising,

positioning the towed body adjacent the ship;

aligning a saddle means laterally with the towed body;

deploying a rudder means attached to the saddle means into the water in the vicinity of the towed body;

moving the saddle means in coordination with the rudder to a position directly above the towed body; and

lowering the saddle means into engagement with one end of the towed body.

**2.** An apparatus for positioning a towed body for retrieval from the water to onboard a towing ship which is underway, comprising,

saddle means;

rudder means attached via a feeler arm to the saddle and functionable to laterally align the saddle directly above the towed body; and

means to engage one end of the saddle means with the towed body and restrict further lateral movement of the saddle means.

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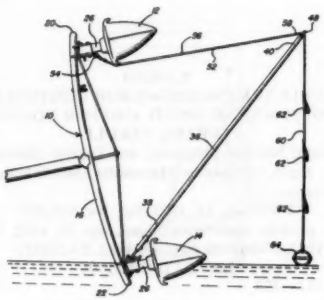
**4,516,518**

## CATAMARAN RIGHTING ACCESSORY

**John M. Cate, 434 Utah St., S.E., Albuquerque, N. Mex. 87108**

**Filed Jul. 8, 1983, Ser. No. 511,988**
**Int. Cl.³ B63B** *3/14*
**U.S. Cl. 114—61** **9 Claims**

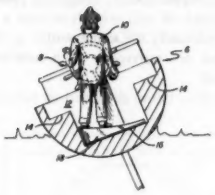


**1.** In combination with a boat having a pair of laterally spaced apart elongated longitudinally extending hulls connected together by a elongated fore and aft transverse bracing structures extending between and anchored relative to fore and aft portions, respectively, of said hulls and wherein said hulls include normally upper and lower surfaces and said boat includes a mast stepped from said fore transverse bracing structure and projecting upwardly therefrom, a righting accessory including mounting means mounted from the underside of one end of said transverse bracing structures adjacent one of said hulls, an elongated structural member, anchor means mounting one end portion of said structural member from said mounting means with said structural member disposed generally in a first plane normal to the longitudinal centerlines of said hulls and with the other end portion of said structural member disposed at least closely adjacent a second plane generally paralleling said most and extending along the longitudinal centerline of the other hull with said other end portion disposed outwardly of the underside of said boat, and elongated flexible tension member means having one end portion anchored relative to the other end of said one bracing structure, a mid-portion thereof engaged with the other end of said structural member and a second free end portion.

## 4,516,519
## WEDGE DEVICE FOR A PLEASURE BOAT COCKPIT

William D. Gulick, Stamford, Conn., assignor to S&A Corporation, Rowayton, Conn.

Filed Mar. 21, 1983, Ser. No. 476,912
Int. Cl.³ B63B 35/00
U.S. Cl. 114—270 4 Claims



1. For use in a sailboat having a cockpit and a helm located in or extending into the cockpit, means provided so a helmsman can stand aproximately vertical regardless of the amount of boat heeling including: a removable and reversible wedge device having a lower surface adapted to be positioned on the upper surface of the sole of the cockpit, non-slip means on said wedge lower surface, the wedge device providing a generally horizontal upper surface when the boat is heeling for the helmsman of the boat to stand upon whereby the fatigue that a helmsman normally experiences due to the heeling is minimized, non-slip means on said upper surface, and the upper surface of said wedge being curved in the athwartships direction.

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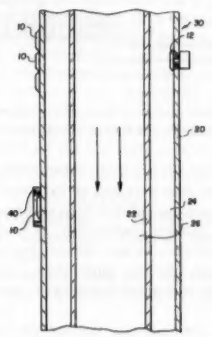
## 4,516,520
## METHOD AND APPARATUS OF THERMAL DETECTION USING BONDED COUPON

Hubert L. Whaley, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Aug. 31, 1982, Ser. No. 413,289
Int. Cl.³ G01K 11/06
U.S. Cl. 116—217 18 Claims



1. A method of detecting the exposure of an inner surface of a component wall to a selected temperature above an ambient, during an operation, comprising:

bonding a coupon to the component wall inner surface using a bonding agent which changes state from a solid to a liquid at a temperature which is equal to at least the selected temperature, whereby the bonding agent no longer bonds the coupon to the component when the component is exposed to the selected temperature;

initiating the operation; and

sonically measuring, from a position on the opposite side of the component wall from said inner surface, thickness through the component wall and any coupon bonded thereto at the location where the coupon was bonded to the component wall to determine whether the coupon is bonded to the component wall.

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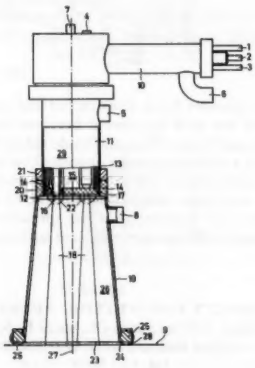
## 4,516,521
## APPARATUS FOR THE COATING OF WORKPIECES BY FLAME SPRAYING

Peter Szelagowski, Elmshorn, and Siegfried Motzkau, Geesthacht, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe G.m.b.H., Karlsruhe, Fed. Rep. of Germany

Filed Apr. 9, 1984, Ser. No. 598,251
Claims priority, application Fed. Rep. of Germany, Apr. 14, 1983, 3313533
Int. Cl.³ B05B 7/20
U.S. Cl. 118—50 12 Claims



1. An apparatus for underwater flame spraying of coatings onto the surface of a workpiece, said apparatus comprising a flame spray gun for the thermal deposition of the coatings, said spray gun having at least one burner jet discharge opening at its front end for discharging a combustible gas and spray mixture and an ignition device associated therewith for igniting the gas mixture discharged therefrom so as to generate a flame, a riser mounted on the front end of said spray gun, said riser surrounding said discharge opening and having a variable length so as to extend from said spray gun to an adjustable extent, said riser further having a release passage at its end remote from the spray gun with which it is adapted to be disposed adjacent said workpiece for the release of gases and vapors from the interior of said riser, and a gas admission nozzle mounted on said riser for admitting gas under pressure to the interior to said riser for the displacement of water therefrom and for drying the surface to be coated in cooperation with the heat generated by the flame of said burner jet.

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## 4,516,522
## SLIDE PREPARATION APPARATUS

F. Robert Drury, Lexington, and Marshall D. Graham, Framingham, both of Mass., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Filed Oct. 14, 1982, Ser. No. 434,378
Int. Cl.³ B05C 17/10, 11/04, 13/02
U.S. Cl. 118—120 7 Claims

1. Apparatus for preparing a monolayer film of a biological fluid sample, such as blood or the like, on a slide for microscopic analysis, comprising:

A. a base having opposite extremities and a flat upper surface between said extremities for supporting a slide thereon and a pair of upstanding guide rails extending along opposite side edges of the surface;

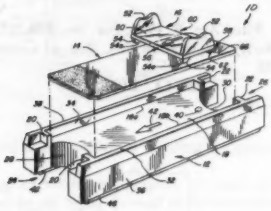
B. a spreader for linear movement between said extremities relative to and engaged with the slide for spreading the sample into a monolayer on the slide comprising:

i. a generally planar platform having first and second ends,

i.i. a pair of spaced apart leg members depending from the platform adjacent said first end,

i.i.i. a sample spreading blade member depending from the platform adjacent said second end; and

i.v. means for moving said spreader linearly,



C. said spreader being constructed and arranged to be positioned for such movement between the guide rails with both said leg members and blade riding on the slide so that when a sample has been deposited on the slide resting on the said surface, said spreader is movable linearly to enable the blade member to form said monolayer during such linear movement of the spreader between said extremities without engaging said surface.

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**4,516,523**

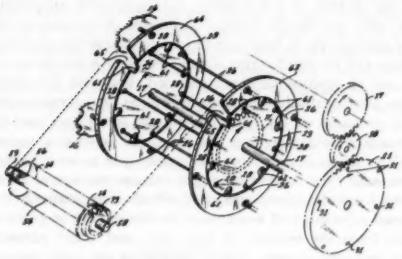
**APPARATUS FOR WETTING APERTURED DISCS**

**David J. Knox, 13016 Ladana Ct., Santa Fe Springs, Calif. 90670**

**Filed Dec. 16, 1983, Ser. No. 562,227**

**Int. Cl.³ B05C** *13/02*

**U.S. Cl. 118—500** **3 Claims**



1. An apparatus for wetting a plurality of apertured discs, which are penetrably supported on at least one dowel, said apparatus comprising:

a pair of spaced side panels secured to one another;

an axle fixedly mounted and disposed normal to said both side panels;

a pair of wheels mounted for unison rotation onto said axle and spaced from each other;

each of said wheels having a plurality of radially extending recesses formed at the periphery thereof, the number and spacing of said recesses being such that one of said recesses on one of said wheels is aligned axially parallel to a respective one of said recesses on said other wheel;

a drive gear also mounted for rotation about said axle in unison with said wheels;

a sun gear fixedly mounted on said axle and disposed between said wheels;

each of said dowels being capable of being nested in one of said recesses on one of said wheels and in one of said recesses on said other wheel so that said dowel is parallel to said axle;

each of said dowels having a planet gear fixed thereto and said planet gear being disposed to mesh with said sun gear whenever said respective dowel is nested within said recesses;

means for rotating said wheels and said drive gear;

a C-shaped keeper fixedly disposed and substantially surrounding each of said wheels so that a radially extending slot approximately the same width as the recesses in said wheels, but not narrower than said recesses, is formed therein; and

both of said slots being disposed to extend upwardly.

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**4,516,524**

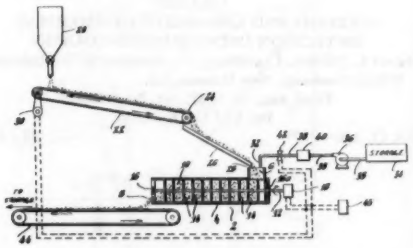
**APPARATUS FOR COATING PARTICULATE MATERIAL**

**Thomas R. McClellan, Seabrook, and Pat L. Murray, Baytown, both of Tex., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed Feb. 16, 1983, Ser. No. 466,940**

**Int. Cl.³ B05B** *17/00*

**U.S. Cl. 118—683** **8 Claims**



1. Apparatus for continuously coating particulate wood furnish material with a fluid binder adhesive which apparatus comprises:

blender means comprising a substantially cylindrical housing having an inlet port and an exit port;

agitator means mounted within said housing and adapted to provide uniform distribution of said binder adhesive in said particulate wood furnish material and continuous propulsion of said particulate material through said blender by said agitator means in combination with paddle means;

means for continuously feeding particulate wood furnish material at a predetermined rate to the inlet port of said blender;

means for continuously feeding fluid binder adhesive at a predetermined rate and in predetermined ratio with respect to the rate of feeding of said particulate wood furnish material to the inlet port of said blender;

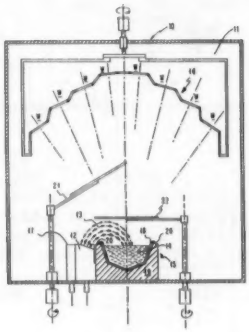
means for transporting said particulate wood furnish material coated with binder adhesive from said exit port of said blender to storage means; and

master control means for synchronously actuating and deactuating each of said agitator means, said means for feeding said particulate wood furnish material and said means for feeding said binder adhesive to said blender.

## 4,516,525
## ELECTRON GUN EQUIPMENT FOR VACUUM DEPOSITION

**Serge Bourgeois, Draveil; Jean-Franqois Carle, Saint Cheron; Henri Lochon, Corbeil Essonnes, and Jean-Pierre Trotin, Milly-La-Foret, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 21, 1983, Ser. No. 544,027**
**Claims priority, application European Pat. Off., Oct. 28, 1982, 82430032.1**
**Int. Cl.³ C23C** *13/12*
**U.S. Cl. 118—688** **8 Claims**

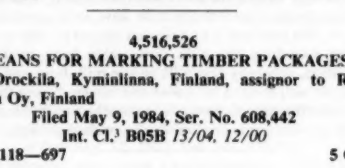


1. An Electron beam system for vacuum metal deposition from a melt thereof comprised of a vacuum chamber having disposed therein a substrate carrier for supporting a plurality of substrates, and an inert open crucible disposed below said carrier and containing a source of the material to be evaporated, and means for melting and evaporation of said source comprised of an electron-beam gun in said chamber generating a beam of electrons focused to directly impinge on said source, a copper hearth in said chamber having a recess for seating said crucible therein; said crucible having a bent-cone configuration comprising a first tapered section extending inwardly from the lip of said crucible and forming a first angle with the vertical, said first section merging with a second conical section tapering inwardly to a point at the bottom of said cup and forming a second angle with the vertical greater than said first angle; and wherein said recess has a configuration corresponding to the configuration of said crucible for nesting thereof in spaced relationship to each other, with said crucible supported in said recess at said lip by a radially extending flange therefrom and supported on the top surface of said hearth.

## 4,516,526
## MEANS FOR MARKING TIMBER PACKAGES

**Kalevi Drockila, Kyminlinna, Finland, assignor to Rauma-Repola Oy, Finland**

**Filed May 9, 1984, Ser. No. 608,442**
**Int. Cl.³ B05B** *13/04, 12/00*
**U.S. Cl. 118—697** **5 Claims**

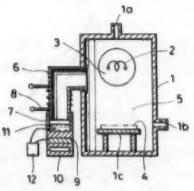


1. A marking apparatus for imprinting the sides of timber packages with data relating to the packages and the goods contained therein, said packages being movable to a marking station at which said apparatus is located, said apparatus comprising a support structure, a vertically disposed frame pivotally attached to said support structure for establishing a coordinate-controlled plane beside one side of a package at said station, a horizontally movable carriage carried by said frame, a vertically movable slide mounted on said carriage, a paint spray gun fixed on said slide, power means for operating said carriage and slide as well as power means for moving said frame from a first position away from the side of the package to a second position close to the side of the package, and remote control means for actuating said power means and spray gun to spray prescribed markings on the side of said package.

## 4,516,527
## PHOTOCHEMICAL VAPOR DEPOSITION APPARATUS

**Shinji Sugioka, Kawasaki, Japan, assignor to Ushio Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 29, 1983, Ser. No. 566,791**
**Claims priority, application Japan, Feb. 1, 1983, 58-13761**
**Int. Cl.³ C23C** *13/12*
**U.S. Cl. 118—723** **3 Claims**

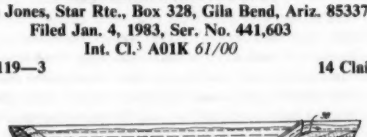


1. A photochemical vapor deposition apparatus comprising:
means, including a vessel, for defining a reaction space in which the photochemical vapor deposition occurs and a discharge space in which electric plasma discharge is generated, said reaction space forming a passage for a photoreactive gas, and said electric plasma being generated for radiating ultraviolet rays which cause a photochemical reaction of said photoreactive gas;
a mercury reservoir outside said vessel and in communication with the discharge space by way of a communication pipe;
means heating said communication pipe to a temperature higher than the temperature of the mercury reservoir; and
means, including a Peltier effect element, for controlling the temperature of the mercury reservoir.

## 4,516,528
## FISH GROWING SYSTEM

**J. Phillip Jones, Star Rte., Box 328, Gila Bend, Ariz. 85337**

**Filed Jan. 4, 1983, Ser. No. 441,603**
**Int. Cl.³ A01K** *61/00*
**U.S. Cl. 119—3** **14 Claims**



1. A self-cleaning aquaculture growing system including in combination:
a raceway in the form of an elongated ditch having a water inlet end and a water outlet end;
means for supplying water at a predetermined flow rate to the inlet end of said ditch; and

a bottom feeding spillway means adjacent the outlet end of said ditch, said spillway means including a spillway lip located below the water level at the outlet end of said ditch, and a coffer dam means above the water level surrounding the spillway lip, said coffer dam means extending downwardly to a predetermined distance above the bottom of said ditch adjacent the spillway lip, whereby said spillway lip and said cofferdam means operate to continuously remove solid wastes and water from the bottom of the outlet end of said ditch.

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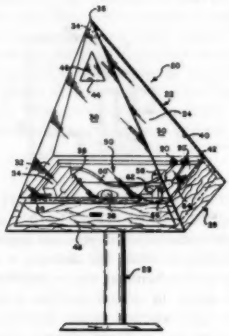
**4,516,529**

## AQUARIUM

**Vincent Lotito, 9 John St., East Rockaway, New York, N.Y. 11518, and Stephen R. Fletcher, 137 S. Village Ave., Rockville Center, N.Y. 11570**

**Filed Aug. 19, 1982, Ser. No. 409,528**
**Int. Cl.³ A01K *64/00***
**U.S. Cl. 119—5** **1 Claim**



1. An aquarium comprising:

a set of triangular transparent walls;

a polygonal floor, said walls standing on the peripheral edges of said floor and being sealed therewith to form a chamber in the form of a pyramid;

water entry and exit ports disposed in said floor on opposite sides of said pyramid and having their orifices located in opposite corners of said polygonal floor and directed through said water perpendicularly to said floor upwardly along the walls of said chamber to induce a circular movement to water in said chamber;

a base mounted to and positioned beneath said chamber for supporting said chamber, a drawer slidably and removably mounted in said base; water treatment equipment located in said drawer and including flexible tubing for connection with said ports; said equipment including a filter for filtering waste material in said water, a heater for heating said water, and a pump for pumping said water via said entry and exit ports and through said filter and past said heater;

a lamp within said chamber for illuminating water within said chamber;

a light beneath said floor for illuminating the water in said chamber, said floor being transparent for propagating illuminating rays of said light into said chamber; and

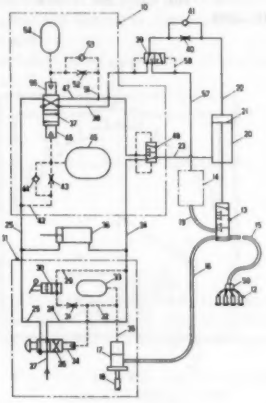
an air pump in said drawer, and an aeration nozzle in said chamber; said air pump and said nozzle being connected by flexible tubing for driving air into said chamber; and a check valve connected between said air pump and said nozzle for preventing back-up of water in said air pump.

**4,516,530**

## MILK SWEEP METHOD AND APPARATUS FOR AUTOMATED MILKING SYSTEMS

**Rolf W. Reisgies, and Robert Camren, both of Waunakee, Wis., assignors to Germania Dairy Automation, Inc., Waunakee, Wis.**

**Filed Oct. 14, 1983, Ser. No. 542,005**
**Int. Cl.³ A01J *5/04***
**U.S. Cl. 119—14.08** **19 Claims**



1. Apparatus for controlling the milking vacuum applied to a teat cup cluster and the milk hose extending therefrom comprising:

(a) a milk flow valve connected to the milk hose and having a first position in which milking vacuum is applied to the milk hose and teat cup cluster and a second position in which the milking vacuum is cut off;

(b) drive means responsive to control signals for switching the milk flow valve between its first and second positions; and

(c) timing and control means for providing control signals to operate the drive means to switch the milk flow valve in response thereto, the timing and control means responsive to a signal indicating the end of milking and the removal of the teat cup cluster from a cow to control the drive means to switch the milk flow valve from its first to its second position to cut off the milking vacuum to the teat cup cluster, the timing and control means also responsive thereafter to a milk sweep initiate signal to control the drive means to switch the milk flow valve from its second to its first position for a selected period of time and thereafter switching the milk flow valve back to its second position, whereby rest milk in the milk hose and teat cup cluster will tend to be drawn therefrom during the period of time the milk flow valve is switched to its second position as vacuum is applied to the open teat cups.

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**4,516,531**

## FEED INTAKE CONTROL APPARATUS FOR ANIMALS

**David C. Snetsinger, Webster Groves; Henry M. Engster, St. Louis, and Dwaine D. Stiebler, Washington, all of Mo., assignors to Ralston Purina Company, St. Louis, Mo.**

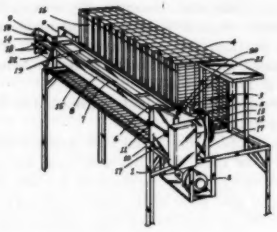
**Filed Mar. 21, 1984, Ser. No. 591,721**
**Int. Cl.³ A01K *31/00, 39/00***
**U.S. Cl. 119—18** **18 Claims**

10. A feed intake control apparatus comprising:

(a) a movable belt adapted to cover a feeding means, wherein a portion of said belt contains an opening to provide both an opened and closed position for said belt over a feeding means;

(b) control means to provide for preselected movement of

said belt to an opened position to permit the animal access to a feeding means and preselected movement to a closed position thereby denying the animal access to said feeding means.



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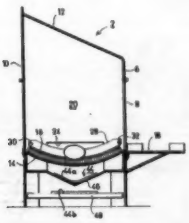
**4,516,532**
**EGG-COLLECTION SYSTEM**
**Gilad Rafaeli, Kibbutz Givat Haim Ichud, Israel**
**Filed Jan. 23, 1984, Ser. No. 572,908**
**Claims priority, application Israel, Feb. 4, 1983, 67832**
**Int. Cl.³ A01K** *31/16*
**U.S. Cl. 119—48** **16 Claims**



1. An egg-collection system for collecting the eggs of laying hens or the like, comprising: an enclosure defining a plurality of hen laying-stations in side-by-side relationship along the length of the enclosure; each of said hen laying-stations including a floor for supporting a hen, which floor is formed with a discharge opening therethrough at one end of the respective station; and a drawer bar means drawable over said floors so as to engage any eggs thereon and to move them to said discharge openings to cause them to drop therethrough by gravity.

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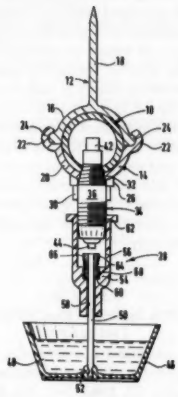
**4,516,533**
**CONDUIT**
**Ronald I. Mallinson, Halifax, England, assignor to Mono-Flo Lister Limited, Halifax, England**
**Filed Aug. 22, 1983, Ser. No. 525,777**
**Claims priority, application United Kingdom, Feb. 11, 1983, 8303881**
**Int. Cl.³ A01K** *39/02*
**U.S. Cl. 119—72** **6 Claims**

1. A drinking supply arrangement comprising an elongated conduit, adapted to be suspended at a plurality of spaced locations therealong, and a plurality of drinking apparatus extending downwardly at spaced locations from said elongated conduit; said elongated conduit including a pipe portion and a flnage portion, said flange portion extending along substantially the complete length of said pipe portion and including a flange and a connecting portion; means for securing said connecting portion to said pipe portion at a plurality of spaced locations along the length of said pipe portion, whereby said pipe portion is suspended from said flange portion and said flange projects radially upwardly from said pipe portion, and for suspending each of said drinking apparatus from said conduit and connecting each of said drinking apparatus for communication with the interior of said pipe portion.



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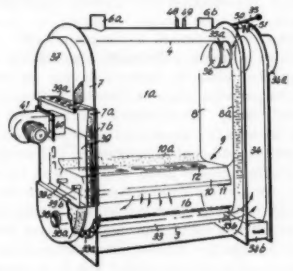
**4,516,534**
**STEEL CONSTRUCTION SOLID-FUEL FIRING BOILER FOR CIVIL HEATING APPLICATIONS**
**Giovanni Jahier, Mantova, Italy, assignor to UNICAL S.p.A., Castel D'Ario, Italy**
**Filed Jun. 11, 1984, Ser. No. 619,569**
**Claims priority, application Italy, Mar. 16, 1984, 18107 A/84**
**Int. Cl.³ F22B** *5/00*
**U.S. Cl. 122—15** **11 Claims**



1. A steel construction solid-fuel firing boiler for civil heating applications, comprising a space portion defined by longitudinal side walls, by a bottom and a cover having an interspace containing water to be heated and comprising delivery and return connections, and by a front wall and a rear wall defining therein, at least in part, a similar interspace, a burner comprising a block of firestone arranged in said space portion and separating said space portion into a fuel containing upper zone and a lower zone where flame extends and flue gases are conveyed from said burner, said burner defining at a top face thereof a housing having, at a bottom portion thereof, a hole communicating said upper and lower zones of the boiler space portion; at least one body of a refractory material accommodated in said housing and resting on said bottom portion thereof, said at least one body presenting at a position directly overlying the hole, a means of holding overlying embers, said housing bottom portion and a surface of said body resting on said bottom portion defining a channel opening at the hole and

communicating with an air distribution chamber located on the front wall of the boiler to convey secondary combustion air; a combustion air feeding electric fan linked to an automatic control circuit and provided with a secondary combustion air outlet in communication with said distribution chamber and a primary combustion air outlet in communication with a high portion of the upper zone of the boiler space portion; a smoke box extending adjacent to the rear wall and in communication with the lower zone of said space portions, said smoke box having, at a top portion thereof, a connection for discharging smokes a loading door on the front wall at the upper zone of said space portion and an inspection door on the front wall at the lower zone of said space portion; a communication port between the upper zone of said space portion and the smoke box at top portions thereof; and a manually operated gate at said communication port.

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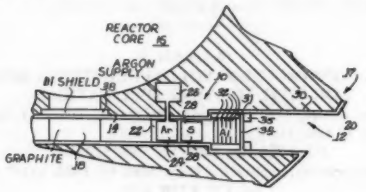
**4,516,535**

## METHODS FOR NEUTRON-CAPTURE TUMOR THERAPY

**John L. Russell, Jr., Alpharetta, and Denise J. Noonan, Atlanta, both of Ga., assignors to Nuclear Medicine, Inc., Atlanta, Ga.**

**Filed Jun. 22, 1982, Ser. No. 390,941**
**Int. Cl.³ A61N** *5/12*
**U.S. Cl. 128—1.1** **11 Claims**




3. A method of treating a patient with a malignant tumor comprising

administering to the patient a compound that selectively accumulates in tumor cells relative to normal cells, said compound including an element having an isotope that emits alpha particles when bombarded with neutrons, said compound being administered in an effective dose whereat the selective accumulation of said isotope in said tumor cells is sufficient to selectively kill tumor cells by alpha particle emission upon bombardment by neutrons,

providing a source that emits a beam of neutrons,

filtering said neutrons through some combination of an aluminum filter, a sulfur filter and an argon filter, which combination selectively transmits neutrons in the epithermal energy range and attenuates gamma radiation, and

positioning the patient so that the tumor is in the path of said filtered beam for a time sufficient to effect tumor destruction.

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**4,516,536**

## THREE CYCLE INTERNAL COMBUSTION ENGINE

**Gerald J. Williams, R.R. #2, Nolalu, Ontario, Canada P0T 2K0**

**Filed May 6, 1981, Ser. No. 261,248**
**Int. Cl.³ F02B** *75/00, 75/26*
**U.S. Cl. 123—39** **6 Claims**

1. An axial cam driven, axially opposed piston type internal combustion engine comprising in combination

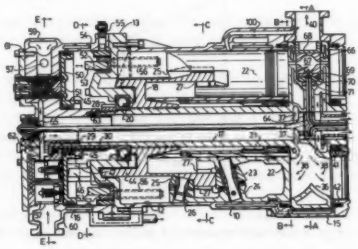
two symmetrical but opposite and opposing cylinder blocks defining a first cylinder block and a second cylinder block, each cylinder block defining axially disposed cylinders arranged in parallel, annularly and symmetrically spaced about a common long axis, all cylinders of each block terminating at a flat plane which is square with said long axis and the cylinders of the cylinder blocks being axially aligned with a cylinder of the opposed cylinder block and separated therefrom by a short distance,

an axially disposed main shaft, concentric with said long axis, said main shaft axially and radially supported by main bearings axially and concentrically arranged in said cylinder blocks on said long axis, said main shaft having a hollow portion which functions as a high pressure charge distribution means, said hollow portion being disposed in said first cylinder block,

a piston in each of said cylinders disposed to form opposing piston pairs,

an axially profiled first axial cam and an axially profiled second axial cam, said first axial cam mounted securely and concentrically on an outward portion of said hollow portion of said main shaft and operatively connected to said pistons in said first cylinder block, said second axial cam mounted securely on an outward portion of said main shaft in said second cylinder block and operatively connect to said pistons in said second cylinder block, said axial cams cooperating with said pistons to convert any reciprocating motion of said pistons to rotational motion of said main shaft, said first axial cam and said second axial cam being symmetrically opposed to impart opposed reciprocating motion to said piston pairs,

a rotary disc valve housing defining a cylindrical housing spanning between said cylinder blocks and forming a rigid structural connection between said cylinder blocks, said rotary disc valve housing including at least one exhaust duct communicating between said housing and surrounding atmosphere,



each of said pistons being movable within one of said cylinders from a top center portion adjacent said rotary disc valve housing to a bottom center position,

a valving means, defining a rotary disc valve comprising a thick flat, circular disc, concentrically and securely mounted on said main shaft between said piston pairs, said disc valve having a thickness closely matching said short distance between said opposing cylinder blocks, said disc valve having a diameter large enough to completely cover said cylinders thereby forming individual combustion chambers therein, said rotary disc valve further including an exhaust port defining a radial opening spanning through the thickness of said disc valve and communicating continuously radially outwardly with said rotry disc valve housing and said atmosphere, said exhaust port being of such annular extent as to be brought into axial alignment with said cylinders during movement from said bottom center position to said top center position of said pistons, said rotary disc valve further including a high pressure charging port defined by a radial opening spanning through the thickness of said disc valve and communicating continuously radially inwardly with said hollow portion of said main shaft, said high pressure charging port being of such annular extent so as to be brought into axial alignment with said cylinders only while said pistons are in the top center position in said cylinders, said high pressure charging port forming a terminating portion of said high pressure charge distribution means,

a gas charge high pressure pre-combustion means, defining a reciprocating piston compressor means for compressing a gas charge to a precombustion pressure, disposed at an end of said first cylinder block, said piston compressor means operatively connected to and driven by said main shaft, said piston compressor means communicating with said hollow portion of said main shaft via a compressor outlet valving means and communicating with a gas charge intake means via a compressor inlet valving means,

said gas charge intake means, defining a means to pre-condition the gas charge including fuel and air mixing means,

an ignition means, defining a means of sequentially igniting the high pressure gas charge in successive ones of said combustion chamber after said high pressure charging port has sequentially been brought out of alignment with successive ones of said combustion chambers;

each combustion chamber is sealed by a first sealing element in the form of a rotary disc valve inner seal, a second sealing element in the form of a rotary disc valve outer seal, and a third sealing elements in the form of cylinder separation seals, said first sealing element defining a first annular ring of cylindrical shape and disposed in a first annular groove concentrically arranged in said cylinder block, said annular ring being biased axially towards and bearing against a flat surface of said rotary disc valve; said second sealing element defining a second annular ring, cylindrically shaped, and disposed in a second annular groove, concentrically arranged in said cylinder block, said second annular ring being biased axially towards and bearing against a flat surface of said rotary disc valve; said third sealing elements defining straight bars, rectangular in sectional outline, and disposed in straight grooves, radially arranged in each cylinder block between said cylinders and spanning from said first annular groove to said second annular groove, said third sealing elements being biased axially towards, and bearing against, a flat surface of said rotary disc valve;

said first cylinder block and said second cylinder block are provided with straight, smooth bored holes to contain said main shaft, and wherein said first sealing element has an outside diameter equal to the inside diameter of said smooth bored holes, said first sealing element being disposed in a separate annular ring, L-shaped in cross section, with an outside diameter equal to an inside diameter of said smooth bored holes.

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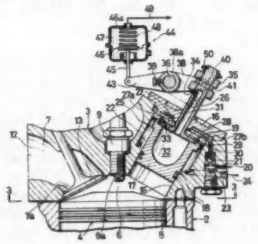
## 4,516,537
## VARIABLE COMPRESSION SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Mitsuharu Nakahara; Tomio Ishida; Norifumi Honjo, and Yoshitaka Yoshida, all of Ikeda, Japan, assignors to Daihatsu Motor Company, Osaka, Japan**

**Filed Mar. 18, 1983, Ser. No. 476,548**
**Int. Cl.³ F02B** *75/04*
**U.S. Cl. 123—48 AA** **15 Claims**



1. A variable compression system for internal combustion engines comprising:

at least one main cylinder communicating with a cooperating combustion chamber having a clearance volume which is adjustable by hydraulic regulation of back and forth movement of a sub-piston slidably mounted within a housing containing a sub-cylinder which communicates with said combustion chamber,

spring means for normally urging said sub-piston away from said combustion chamber,

a pressure oil chamber formed on a back face of said sub-piston and pressurized from a pressure source,

a control valve for controlling supply of pressure oil, serving as actuating oil, to said pressure oil chamber, said control valve being closed when pressure rise occurs in said pressure oil chamber,

a reciprocative member connected at one end to said sub-piston and having a portion projecting out of said housing containing said sub-cylinder, said reciprocative member having an internal oil passage which communicates with said pressure oil chamber,

a spill port formed in said reciprocative member where said portion projects out of said housing containing said sub-cylinder, communicated with said internal oil passage for releasing therethrough said actuating oil introduced from said pressure oil chamber into said internal oil passage,

a spill regulation member slidably mounted on said reciprocative member where said portion projects out of said housing containing said sub-cylinder, so as to close said spill port when said sub-piston moves away from said combustion chamber and open said spill port when said sub-piston moves toward said combustion chamber, and

means for operating said spill regulation member being located outside of said housing.

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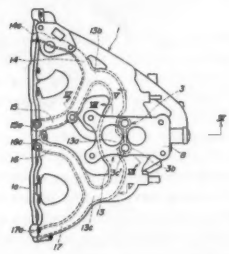
## 4,516,538
## INTAKE MANIFOLD FOR INTERNAL COMBUSTION ENGINES

**Tetsuo Arakawa, Asaka, and Kenichi Nagahiro, Kawagoe, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 16, 1983, Ser. No. 533,149**
**Claims priority, application Japan, Sep. 21, 1982, 57-142898**[U]
**Int. Cl.³ F02M** *25/00*
**U.S. Cl. 123—52 M** **5 Claims**



1. In an intake manifold for an internal combustion engine, said engine having a plurality of main combustion chambers, a plurality of auxiliary combustion chambers communicating with respective ones of said main combustion chambers, and a carburetor unit, said intake manifold having:

an interior thereof formed with a plurality of main intake passages connected to respective ones of said main combustion chambers,

a plurality of auxiliary intake passages connected to respective ones of said auxiliary combustion chambers,

a main distributing chamber from which diverge said main intake passages, and

an auxiliary distributing chamber from which diverge said

auxiliary intake passage in two substantially horizontally opposite directions,

said auxiliary distributing chamber being disposed to overlap with said main distributing chamber at a location downward thereof in a vertical direction,

said main distributing chamber and said auxiliary distributing chamber being adapted for connection to said carburetor unit at a location downstream thereof,

said intake manifold having a partition wall extending through said main distributing chamber along the entire length thereof in a direction of flow of a mixture therein and dividing said main distributing chamber into a primary distributing chamber and a secondary distributing chamber,

the improvement wherein said partition wall has a boss, and an intake guide passage formed through said boss,

said intake guide passage opening at one end thereof in an outer surface of said intake manifold, said outer surface forming a carburetor-mounting surface, and opening at another end thereof in said auxiliary distributing chamber, said other end of said intake guide passage being directed toward a horizontally substantially central location of said auxiliary distributing chamber.

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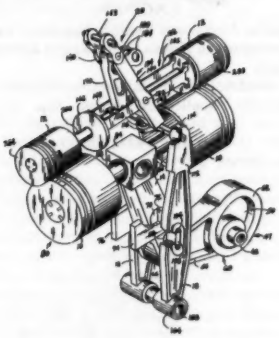
**4,516,539**

## INTERNAL COMBUSTION ENGINE

**John F. Andreen, R.R. #3, Cadillac, Mich. 49601**

**Filed Sep. 26, 1983, Ser. No. 535,950**
**Int. Cl.³ F02B** *75/32*
**U.S. Cl. 123—53 R** **22 Claims**



1. An internal combustion engine comprising:

an engine housing having a first piston cylinder;

a first piston mounted for reciprocation in said first cylinder;

counterbalance arm means pivotally coupled to said housing for pivotal movement and for counterbalancing said first piston, said counterbalancing arm means including a counterbalance head;

a first pump means for reciprocating within said housing in opposition to said first piston for forcing an uncombusted charge into said first cylinder after said first piston has withdrawn from the ignition of a previous charge; and

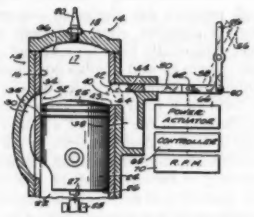
linkage means for coupling said first piston to said counterbalance arm for reciprocation by said pivotal movement of said counterbalance arm and for coupling said first pump means to said counterbalance arm means for reciprocation by said pivotal movement of said counterbalance arm, such that said pump means and said counterbalance head reciprocate in opposition to the reciprocation of said first piston.

**4,516,540**

## TWO-CYCLE INTERNAL COMBUSTION ENGINE INCLUDING MEANS FOR VARYING CYLINDER PORT TIMING

**James S. Nerstrom, Gurnee, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Division of Ser. No. 141,906, Apr. 21, 1980, Pat. No. 4,341,188.**
**This application May 10, 1982, Ser. No. 376,705**
**Int. Cl.³ F02D** *39/04*
**U.S. Cl. 123—65 PE** **3 Claims**




1. A two-cycle internal combustion engine comprising an engine block including a cylindrical wall defining a cylinder having a head end, a piston mounted for reciprocative movement in said cylinder relative to said cylinder head end, a passage in said engine block terminating at said cylindrical wall in a port having upper and lower edges at given distances from said cylinder head end and valve means mounted for movement inside said passage relative to said port to selectively vary the effective distance of one of said port edges from said cylinder head end, said valve means comprising a valve member including an inner end portion having an arcuate edge portion which has a concave contour corresponding to that of said cylinder wall and which is chamfered, said valve member being mounted for radially reciprocative movement relative to said cylindrical wall and to said port between a first position wherein said valve member edge portion is spaced radially outwardly from said wall and does not substantially affect the effective distance of said one port edge from said cylinder head end and a second position wherein said valve member edge portion is located adjacent said wall and said port and acts as said one port edge to effectively change the distance thereof from said cylinder head end, and means for moving said valve member between the first and second positions.

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**4,516,541**

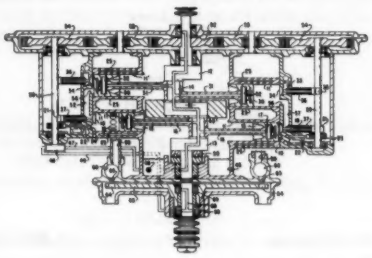
## INTERNAL COMBUSTION ENGINE WITH SUPERCHARGER

**James A. Yungclas, E. Friendship Haven, Room 120, Fort Dodge, Iowa 50501**

**Filed Jul. 7, 1983, Ser. No. 511,581**
**Int. Cl.³ F02B** *33/22*
**U.S. Cl. 123—70 R** **2 Claims**

1. An internal combustion engine including a crankcase, at least two opposed power cylinder and piston assemblies and two opposed supercharger cylinder and piston assemblies mounted in said crankcase, a single crankshaft journalled on a vertical axis in said crankcase, piston means in each of said cylinders each piston having a connecting rod, said crankshaft having a single power throw on which both power piston connecting rods are journalled and a single second throw on which both supercharger piston connecting rods are journalled, a flywheel fixed on said crankshaft between said power throw and said second throw, means for admitting air into said supercharger cylinders and means for conducting compressed air from each supercharger cylinder to its adjacent power cylinder, means for injecting fuel into said power cylinder, ignition means for igniting said fuel and timing means for properly sequenced timing of the entrance and exhaust of fuel and gases into and from said cylinders and for ignition within

said power cylinders, a sump for lubricating material formed in said crankcase at its lower part, pump means communicating with said sump to pump said lubricating material from said sump throughout means in said engine to distribute said material, a turbine wheel journalled in said crankcase coaxially with said crankshaft, means for conducting exhaust gases from said power cylinder to said turbine wheel and guide means adjacent said wheel to direct said exhaust gases to impinge on said wheel.



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**4,516,542**

## VALVE OPERATION CHANGING SYSTEM OF INTERNAL COMBUSTION ENGINE

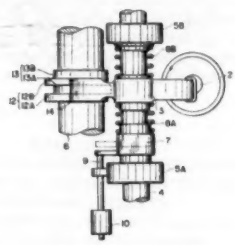
**Shunichi Aoyoma, Yokosuka, and Manabu Kato, Tokyo, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed May 31, 1983, Ser. No. 499,465**

**Claims priority, application Japan, Jun. 2, 1982, 57-94378; Jul. 27, 1982, 57-113690[U]; Jan. 12, 1983, 58-2326[U]**

**Int. Cl.³ F01L *1/34***

**U.S. Cl. 123—90.16** **19 Claims**



1. A valve operation changing system of an internal combustion engine, comprising:

first and second cams formed on a camshaft, said first and second cams being different in cam profile from each other, at least said first cam having a plurality of cam faces, said plurality of cam faces of said first cam being so axially separate from each other that a cam face of said second cam is locatable therebetween;

a rocker arm mounted on a rocker shaft and swingable relative to the rocker shaft so as to operate an engine valve, said rocker arm being formed with a follower section which has a plurality of contact faces contactable with said cam faces, said rocker arm being movable in the axial direction of said rocker shaft between a first position in which at least one of said plurality of contact faces of said follower section is brought into contact with one of said plurality of cam faces of said first cam and a second position in which at least one of said plurality of contact faces of said follower section is brought into contact with the cam face of said second cam; and

means for selectively placing said rocker arm in one of said first and second positions in accordance with an engine operating condition.

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**4,516,543**

## CIRCUIT FOR CONTROLLING GLOW PLUG ENERGIZATION

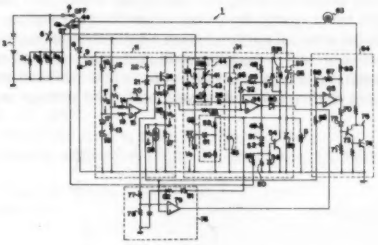
**Yoshiaki Abe, Higashimatsuyama; Yutaka Nishimura, Kawagoe, and Hitoshi Sugimoto, Higashimatsuyama, all of Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Jun. 10, 1982, Ser. No. 386,911**

**Claims priority, application Japan, Jun. 10, 1981, 56-088294**

**Int. Cl.³ F02N *17/00***

**U.S. Cl. 123—179 H** **10 Claims**



1. A circuit for controlling glow plug energization for use with a diesel engine having at least one glow plug energized by actuation of an ignition switch having an OFF position, an ON position for connecting said circuit to a power sources and an ST position for starting the diesel engine, said circuit comprising:

a first circuit means for producing a simulation voltage signal with a level which changes substantially in accordance with the change of glow plug temperature upon glow plug energization and deenergization;

a second circuit means for generating a first reference voltage signal with a level which is determined in relation to a desired glow plug temperature and which is changed in magnitude in response to the change in the voltage of said power source and the temperature of the engine coolant, the magnitude of said reference voltage signal being changed inversely with changes in the voltage of said power source;

means for comparing the level of said simulation voltage signal with that of said first reference voltage signal; and

a switching means responsive to the resulting output of said comparing means for controlling the flow of current from said power source to the glow plug to energize the glow plug, whereby the glow plug is energized so as to be heated to said desired glow plug temperature.

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**4,516,544**

## HELICALLY-SHAPED INTAKE PORT OF AN INTERNAL-COMBUSTION ENGINE

**Takeshi Okumura; Kiyoshi Nakanishi, both of Susono, and Mikio Nakajima, Okazaki, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed May 13, 1983, Ser. No. 494,387**

**Claims priority, application Japan, May 25, 1982, 57-087210; May 25, 1982, 57-087206**

**Int. Cl.³ F02F *1/42***

**U.S. Cl. 123—188 M** **25 Claims**

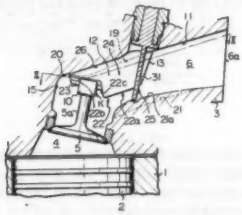
1. An intake device of an internal-combustion engine comprising:

an intake valve having a valve stem;

an axially extending intake port passage having an inlet opening at one end thereof and an outlet opening at the other end thereof, said intake port passage having a substantially cylindrically extending circumferential wall

which circumferentially extends about said valve stem, a first side wall which extends between said inlet opening and said circumferential wall along an axis of said intake port passage, a second side wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage and is arranged so that it faces said first side wall, an upper wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage, and a bottom wall which extends between said inlet opening and said circumferential wall along the axis of said intake port passage;

a separating wall projecting downwardly from said upper wall and spaced from said bottom wall, said separating wall extending along the axis of said intake port passage and being spaced from said circumferential wall so as to define a helical poriton having a helix-terminating poriton between said separating wall and said circumferential wall, said separating wall having a first side wall spaced from the first side wall of said intake port passage so as to



define therebetween an inlet passage portion tangentially connected to said helical portion, said separating wall having a second side wall spaced from the second side wall of said intake port passage so as to define therebetween a bypass passage which interconnects said inlet passage portion and said helix-terminating poriton, the second side wall of said separating wall having an expansion portion which expands towards said circumferential wall and which is located in said helical portion in the vicinity of an outlet portion of said bypass passage, said circumferential wall having an expanding portion which expands towards the expanding portion of the second side wall of said separating wall so as to define a first narrow passage portion between said expanding protions;

normally closed valve means arrnaged in said bypass passage for controlling the flow area of said bypass passage; and

actuating means for actuating said vlave means in response to the change in the operating condition of the engine to open said valve means when the engine is operating at a high speed under a heavy load.

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**4,516,545**

## APPARATUS FOR CONTROLLING THE ROLLING OF AN ENGINE

**Naotake Kumagai, Aichi; Minoru Tatemoto, Okazaki; Itoh: Yoji, Nagoya, and Tokushige Inuzuka, Okazaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 9, 1984, Ser. No. 598,041**

**Claims priority, application Japan, Apr. 15, 1983, 58-56182[U]; Apr. 15, 1983, 58-56184[U]; Apr. 15, 1983, 58-56185[U]; Apr. 15, 1983, 58-56187[U]; Apr. 15, 1983, 58-56188[U]**

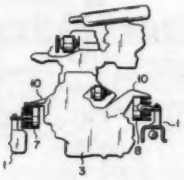
**Int. Cl.³ F16F** *9/04;* **F16M** *5/00*

**U.S. Cl. 123—192 R** **10 Claims**

1. An apparatus for controlling the rolling of the engine of an automobile, comprising:

detecting means for detecting that changes have been achieved by an automatic transmission in lever position and gear position;

engine-roll control means for controlling the rolling of the engine;



a drive mechanism for driving the engine-roll control means; and

a drive circuit for actuating the drive mechanism for a predetermined period of time in response to an output signal from the detecting means.

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**4,516,546**

## V-TYPE OVERHEAD-CAMSHAFT ENGINE

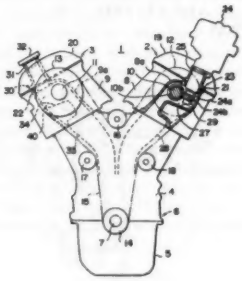
**Masahiro Choushi, Hiroshima, and Tetsuji Yahiro, Higashihiroshima, both of Japan, assignors to Mazda Motor Corporation, Japan**

**Filed Apr. 18, 1984, Ser. No. 601,729**

**Claims priority, application Japan, Apr. 18, 1983, 58-68788; Mar. 29, 1984, 59-61723**

**Int. Cl.³ F02B** *77/14*

**U.S. Cl. 123—195 A** **14 Claims**



1. A V-type overhead-camshaft engine comprising first and second cylinder banks arranged in V-shape and respectively having a first cylinder head assembly and a second cylinder head assembly for supporting first and second camshafts, the first and second camshafts being operatively connected at their one end with one end of a crankshaft for synchronized rotation with the crankshaft, a row of a plurality of cylinders being formed in each cylinder bank to extend in the axial direction of the camshaft between front and rear ends of the engine the row of the cylinders in the first cylinder bank starting from a location spaced apart from the front end of the engine and terminating at a location near the rear end of the same, the row of the cylinders in the second cylinder bank starting from a location near the front end of the engine and terminating at a location spaced apart from the rear end of the same, wherein said first cylinder head assembly is provided with an opening at a location corresponding to the part of the first cylinder bank between the front end of the engine and the foremost cylinder in the first cylinder bank and said second cylinder head assembly is provided with an opening at a location corresponding to the part of the second cylinder bank between the rear end of the engine and the rearmost cylinder in the second cylinder

bank, the openings in the cylinder head assemblies being identical to each other and located symmetrically with respect to the center of the engine as viewed from above, one of the openings forming an oil filler section, and the other opening forming an engine auxiliary mechanism mounting section for mounting an engine auxiliary mechanism which is to be driven by the corresponding camshaft.

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**4,516,547**

## FUEL SUPPLY SYSTEM

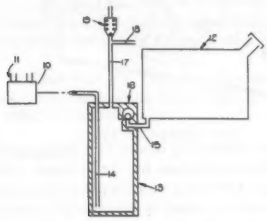
**Derek Williams, Hertford, England, assignor to Lucas Industries public limited company, Birmingham, England**

**Filed Jul. 19, 1983, Ser. No. 515,179**

**Claims priority, application United Kingdom, Aug. 3, 1982, 8222350**

**Int. Cl.³ F02D** *19/00*

**U.S. Cl. 123—198 A** **5 Claims**



1. A fuel supply system for an internal combustion engine comprising a fuel delivery unit through which fuel can be supplied to an associated engine, a fuel supply pump for supplying fuel to the delivery unit, a supply tank from which fuel in use is drawn by the supply pump, a subsidiary fuel tank, a conduit through which said subsidiary fuel tank can be supplied with fuel from the supply tank, a one way valve in said conduit, said one way valve acting to prevent the flow of fuel from the subsidiary fuel tank to the supply tank and a further conduit through which said subsidiary fuel tank can be pressurized with air to force fuel from the subsidiary fuel tank towards said fuel delivery unit.

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**4,516,548**

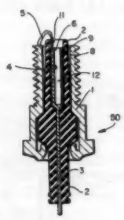
## IGNITION DEVICE FOR IMPROVING THE EFFICIENCY OF AND TO REDUCE EMISSIONS OF INTERNAL COMBUSTION ENGINES

**Michael G. May, CH-1180 Rolle, Bel Air, Switzerland**

**Filed Oct. 28, 1983, Ser. No. 546,250**

**Int. Cl.³ F02P** *15/00*

**U.S. Cl. 123—260** **14 Claims**



1. An ignition device for improving the thermodynamic efficiency of externally ignited spark ignited combustion engines including a main combustion chamber and which has an ignition chamber communicating by means of at least one transfer channel with said main combustion chamber comprising a housing secured at one end to an insulator, a socket in said insulator, a ground electrode on said housing and directed toward a central electrode disposed in said insulator in said housing thereby to form a spark gap therebetween, said central electrode constructed and arranged to have a terminus and to conduct a sparking voltage towards said spark gap, said central electrode further being formed with only part of its length as a hollow body including an orifice and confined by said socket, and said hollow body being insulated from said ground potential and said socket in said insulator such that the spark between the ground electrode and the hollow body is generated within the confinement of the orifice of said hollow body thereby igniting the charge contained therein.

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**4,516,549**

## INTERNAL COMBUSTION ENGINE

**Frederick Brear, Peterborough, England, assignor to Massey-Ferguson-Perkins Limited, London, England**

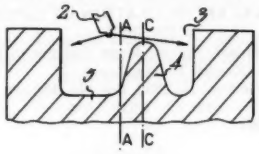
**PCT No. PCT/GB82/00241, § 371 Date Apr. 4, 1983, § 102(e) Date Apr. 4, 1983, PCT Pub. No. WO83/00531, PCT Pub. Date Feb. 17, 1983**

**PCT Filed Aug. 4, 1982, Ser. No. 491,956**

**Claims priority, application United Kingdom, Aug. 13, 1981, 8124723**

**Int. Cl.³ F02N** *17/08;* **F02B** *3/06, 3/00*

**U.S. Cl. 123—276** **15 Claims**



1. An internal combustion engine comprising a piston having a recessed combustion bowl with a raised projection in the floor of the bowl so as to define an annulus with the sides of the bowl, swirl means to cause the inlet air to rotate about said raised projection, and a fuel injector having orifices that spray a plurality of jets into the annulus at spaced points around the projection, characterised in that the cross-sectional area of the annulus varies around the projection (4) and has a single minimum value in a median plane (D—D) through the axis (C) of the projection (4), the centre (A) of the bowl (3) and the centre of the injector nozzle (2); and the injector nozzle (2) is located on the opposite side of the axis (C) from the minimum value cross-sectional area of the annulus and has orifices orientated so as to direct jets of fuel both sides of said median plane (D—D).

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**4,516,550**

## ELECTRONIC CONTROL DEVICE FOR A FUEL METERING SYSTEM OF AN INTERNAL COMBUSTION ENGINE WITH SELF-IGNITION

**Rainer Buck, Tamm; Thomas Küttner, Stuttgart; Fridolin Piwonka, Tamm, and Wolf Wessel, Oberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Continuation of Ser. No. 415,615, Sep. 3, 1982, abandoned. This application May 7, 1984, Ser. No. 606,555**

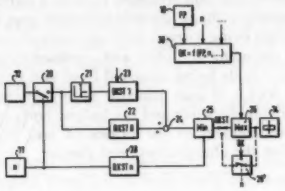
**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1982, 3209433**

**Int. Cl.³ F02D** *31/00*

**U.S. Cl. 123—357** **12 Claims**

1. A method for determining a fuel quantity control signal in a fuel metering system of an internal combustion engine with self-ignition, having sensors for operating parameters and function transducers for a set-point value of the fuel quantity in accordance with operating parameters, comprising the steps of, pre-specifying at least one of a time-dependent starting fuel

quantity and an rpm-dependent starting fuel quantity as the fuel quantity control signal during starting below a predetermined rpm value, selecting the set-point value of the fuel quantity as the fuel quantity control signal during starting above a predetermined rpm value that is below idle speed, and reducing the set-point value of the fuel quantity at least in accordance with rpm.



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**4,516,551**

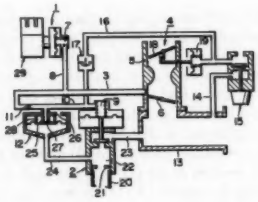
## CONTROL SYSTEM FOR IGNITION TIMING AND EXHAUST GAS RECIRCULATION OF COMBUSTION ENGINE

**Masahiro Urushidani, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan**

**Filed Dec. 16, 1982, Ser. No. 450,374**

**Int. Cl.[2] F02P** *5/04*

**U.S. Cl. 123—407** **6 Claims**



1. A control system for ignition timing and exhaust gas recirculation of a combustion engine having a throttle valve in a carburetor, comprising:

a vacuum controller operated by negative pressure of an air passageway of said carburetor to advance the ignition timing;

an EGR valve operated by said negative pressure to recirculate the exhaust gas;

a temperature sensing valve for sensing an engine temperature which introduces atmosphere to said vacuum controller as well as to said EGR valve when the engine temperature is low;

a pressure control valve which introduces the atmosphere by a flow ratio substantially in inverse proportion to a pressure of the exhaust gas;

a negative pressure line which introduces said negative pressure at a portion in a carburetor upstream of said throttle valve to said vacuum controller and said EGR valve; and

a check valve provided in a line from said temperature sensing valve to said negative pressure line, said check valve closing when said temperature sensing valve introduces said negative pressure to said line from said temperature sensing valve to said negative pressure line.

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**4,516,552**

## AIR QUALITY MEASURING DEVICE FOR A FUEL INJECTION INSTALLATION

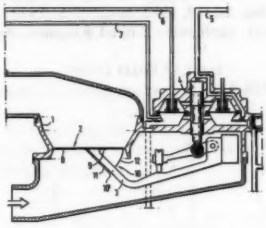
**August Hofbauer, Pforzheim, and Erich Exinger, Stuttgart, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany**

**Filed Oct. 28, 1983, Ser. No. 546,557**

**Claims priority, application Fed. Rep. of Germany, Oct. 30, 1982, 3240271**

**Int. Cl.[3] F02M** *39/00*

**U.S. Cl. 123—452** **15 Claims**



1. An air quantity measuring device of a continuously operating fuel injection installation for an internal combustion engine, comprising a baffle plate means pivotally arranged in a housing on a lever, the pivoting movements of the baffle plate means being dependent on the through-flowing air quantity, for actuating a control piston of a quantity distributor for the distribution of fuel to cylinders of the internal combustion engine, the baffle plate means being provided on its inflow side with a raised means for reducing its flow resistance, the raised means having a peak disposed eccentrically to the baffle plate means and including a first portion rising approximately from the center of the baffle plate means to said peak and a second portion dropping off from the peak to the edge of the baffle plate means and terminating flush therewith.

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**4,516,553**

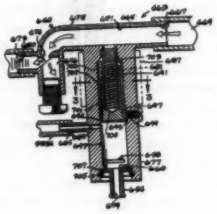
## COMBUSTION AND POLLUTION CONTROL SYSTEM

**John E. Lindberg, Lafayette, Calif., assignor to Owen, Wickersham & Erickson, San Francisco, Calif.**

**Division of Ser. No. 190,932, Sep. 25, 1980, Pat. No. 4,331,525, which is a division of Ser. No. 657,747, Feb. 13, 1976, abandoned, which is a continuation-in-part of Ser. No. 613,867, Sep. 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 356,589, May 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 227,440, Feb. 18, 1972, abandoned. This application Jul. 14, 1983, Ser. No. 513,901**

**Int. Cl.[3] F02B** *47/08*

**U.S. Cl. 123—568** **8 Claims**



1. An inverter apparatus for producing an increasing vacuum effect in response to a decreasing vacuum field, said inverter apparatus comprising, cylinder means having an internal cylindrical bore, piston means axially movable within the

cylindrical bore, said piston means having a first surface exposed to the vacuum in said vacuum field and having a second surface exposed to atmospheric pressure, spring means for biasing said piston means in a direction opposed to the direction of movement which would be produced by atmospheric pressure on said second surface, a fluid inlet passageway extending through said cylinder means and opening into the cylindrical bore, said piston means having an axially extending side wall facing the cylindrical bore, orifice means formed in said side wall and an outlet passageway located at one end of the orifice means for connecting said end with that portion of the bore having the vacuum acting on said first surface of said piston means, and wherein said axially extending orifice is so located in the side wall of said piston means as to provide a decreasing restriction to flow of fluid from said inlet passageway through the orifice to the outlet with decreasing vacuum.

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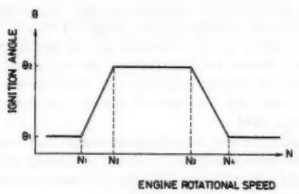
**4,516,554**

## IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

**Nobuo Miura, Wako, and Nolihisa Ishii, Sakado, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 29, 1983, Ser. No. 480,063**
**Claims priority, application Japan, Mar. 31, 1982, 57-053163; Oct. 20, 1982, 57-184096**
**Int. Cl.³ F02P** *5/04*
**U.S. Cl. 123—418** **11 Claims**




1. An ignition control system for supplying a trigger signal to an ignition plug driving circuit which exerts a high-tension pulse to an ignition plug of an internal combustion engine, which comprises:

timing pulse generating means for producing first and second timing pulses at the positions of greatest ignition advancement and retardation of each engine cycle, respectively, per engine cycle; and

trigger signal generating means connected to said timing pulse generating means, for producing said trigger signal at a desired ignition timing in response to said timing pulses, said trigger signal generating means keeping the ignition timing at a retarded constant level when the instantaneous engine speed is within either a lower engine speed range or a higher engine speed range and keeping the ignition timing at an advanced constant level when the instantaneous engine speed is within a middle engine speed range, and changing the ignition timing generally proportionate to the instantaneous engine speed within a first transitional range between the lower and the middle engine speed ranges and changing the ignition timing generally inversely proportionate to the instantaneous engine speed within a second transitional range between the middle and the higher engine speed ranges, said trigger signal generating means including,

first saw-tooth wave generating means for generating a first saw-tooth wave signal having each apex thereof coincident to each of said second timing pulses and having each sloped portion thereof lasting between the successive two of said second timing pulses,

second saw-tooth wave generating means for generating a second saw-tooth wave signal abruptly rising up to a certain level at the occurrence of each of said first timing pulses and gradually increasing in level at a steepness greater than that of the sloped portion of said first saw-tooth wave signal and dropping down in level coincident to the occurrence of each of said second timing pulses,

comparing means for comparing in level said first and second saw-tooth wave signals and for producing an ON signal when the difference in level between said first and second saw-tooth wave signals reaches a predetermined value,

trigger signal generating means for generating said trigger signal in response to said ON signal, and

inhibiting circuit means for inhibiting said ON signal from being supplied to said trigger signal generating circuit during a predetermined time period beginning after the occurrence of said second timing pulse.

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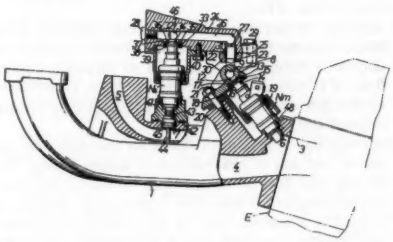
**4,516,555**

## FUEL FEEDING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

**Toshio Shioya, and Katsuhiko Kimura, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 24, 1984, Ser. No. 603,558**
**Claims priority, application Japan, Apr. 25, 1983, 58-72439**
**Int. Cl.³ F02M** *55/00*
**U.S. Cl. 123—470** **8 Claims**



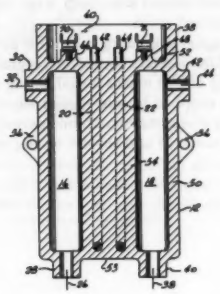
1. A fuel injection feeding system for an internal combustion engine having a plurality of main combustion chambers and sub combustion chambers, a plurality of main feed injection nozzles with rear ends, a sub fuel injection nozzle with a rear end and an intake manifold, comprising, a fuel distributor having a main fuel passage therethrough, said fuel distributor being mounted to the intake manifold, a fuel branching member having a branch fuel passage therethrough, an upper mounting surface formed on the upper side of said fuel distributor, a fuel communication passage through said upper surface communicating with said main fuel passage, a lower mounting surface formed on the lower side of said fuel branching member, a first end of said branch fuel passage being open to said lower mounting surface, a second end of said branch fuel passage being open to the atmosphere, means to connect said lower mounting surface to said upper mounting surface, a guide sleeve fitted within said first end of said branch fuel passage and said fuel communication passage in said upper mounting surface, an annular seal member fitted about said guide sleeve, means to seal said second end of said branch fuel passage, passageway means to insert the rear ends of the main fuel injection nozzles into said fuel distributor and passageway means to insert the rear end of the sub fuel injection nozzle into said fuel branch member.

**4,516,556**

## FUEL PREHEATER

**Howard E. Meyer, Slippery Rock, Pa., assignor to Heat Exchange and Transfer, Inc., Pittsburgh, Pa.**

**Filed Feb. 3, 1984, Ser. No. 576,568**
**Int. Cl.³ F02M *31/00***
**U.S. Cl. 123—557** **10 Claims**



1. In a preheater system for use in conjunction with an internal combustion engine, the combination comprising:

a preheater body member;

a fuel flow conducting channel defined within said body member and adapted to have a flow of fuel passed continuously therethrough;

a pair of selectively operable heat sources associated with said body member in heat exchange relationship with said fuel flow conducting channel for supplying energy to heat such a flow of fuel;

at least one of said pair of heat sources including an engine block coolant flow conducting channel formed within said body member and adapted to sustain a continuous flow of engine coolant therethrough for recirculation of such engine coolant through said coolant flow conducting channel and the engine block;

selectively operable control means for selecting operation of one of said pair of heat sources to supply energy for preheating said flow of fuel said pair of heat sources, including the engine coolant flow conducting channel, being located in a manner that the body member provides for heat transfer from said pair of heat sources to the flow of fuel passing through said fuel flow conducting channel,

a selectively operable additional heater means carried by said body member for heating the flow of engine coolant within said engine coolant flow conducting channel, and a thermostatic control for limiting the heat input from said selectively operable additional heater means according to a preselected maximum temperature for said engine coolant.

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**4,516,557**

## IGNITION APPARATUS FOR INTERNAL COMBUSTION ENGINE

**Katsuyoshi Masuno, and Tsutomu Kamata, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP82/00313, § 371 Date Mar. 2, 1983, § 102(e) Date Mar. 2, 1983, PCT Pub. No. WO83/00537, PCT Pub. Date Feb. 17, 1983**
**PCT Filed Aug. 10, 1982, Ser. No. 486,277**
**Claims priority, application Japan, Aug. 10, 1981, 56-119294[U]**
**Int. Cl.³ F02P *1/00*; H03F *1/00*; H02K *11/00***
**U.S. Cl. 123—619** **5 Claims**

1. An ignition apparatus for an internal combustion engine, comprising:

a rotary shaft for being rotated in synchronism with the internal combustion engine;

a signal rotor mounted to said rotary shaft for being rotated therewith;

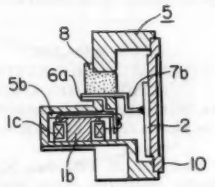
a core opposing said signal rotor;

a core coil wound about said core;

a metal heat sink;

a frame connected to said heat sink so as to form a casing having an interior, said frame having a recess opening into said interior, said frame having a grooved portion extending into said recess from said interior;

an integrated circuit disposed on said heat sink, said integrated circuit including a capacitor electrically connected



to said core coil to form a resonance circuit, oscillation energy supply means for supplying oscillation energy to said resonance circuit, oscillation detecting means, responsive to oscillation energy in said resonance circuit for producing a output signal, amplifier means for applifying said output signal to produced an amplified signal, and switch means for interrupting the amplified signal;

ignition coil means, responsive to interruption of the amplified signal by said switch means, for generating a high voltage; and

connecting means, including electrical lead wires connected at one end to said core coil and extending from said recess in said grooved portion, for electrically connecting said core coil to said capacitor.

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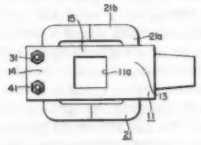
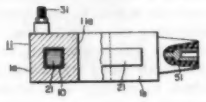
**4,516,558**

## IGNITION COIL DEVICE FOR INTERNAL COMBUSTION ENGINE

**Yutaka Oohashi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jun. 21, 1983, Ser. No. 506,365**
**Claims priority, application Japan, Jun. 30, 1982, 57-115065**
**Int. Cl.³ F02P *3/02***
**U.S. Cl. 123—634** **4 Claims**





1. An ignition coil device for an internal combustion engine comprising:

a core including two U-shaped core parts, each of which has a pair of connecting portions protruding from the ends of

a leg portion in the same direction, and said two core parts being connected by butting the ends of corresponding connecting portions;

said core defining a core aperture surrounded by said leg portions and said connecting portions;

a coil assembly including coils wound on said leg portions of said core;

said coil assembly having a molding material with an insulating property which is formed so as to cover said coils therein;

said coil assembly further having molding material which is formed so as to provide a coupling portion connecting said coils and extending within said coil aperture, said coupling portion of molding material and said molding material which covers said coils being integral to maintain said coils in assembled relationship and said core parts in abutting relationship and having a coil aperture extending through said coupling portion coaxially with said core aperture; and

said coils being used for generating a high voltage for activating spark plugs.

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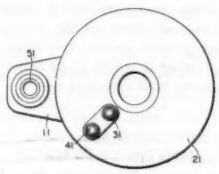
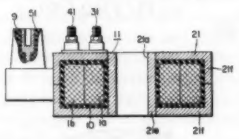
**4,516,559**

## IGNITION COIL DEVICE FOR INTERNAL COMBUSTION ENGINE

**Yutaka Oohashi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jun. 24, 1983, Ser. No. 507,569**
**Claims priority, application Japan, Jun. 30, 1982, 57-115066**
**Int. Cl.³ F02P *3/02***
**U.S. Cl. 123—634** **1 Claim**





1. An ignition coil device for an internal combustion engine comprising:

a core which includes a first annular core member having a central axis and a second core member;

said second core member being connected to said first core member so as to define a toroidal coil space outside said first core member and being split along a plane transverse to said axis to divide said second core member into separate parts, each having an axially extending cylindrical section and a radically extending annular section;

a toroidal coil assembly which is arranged in said toroidal coil space; and

said toroidal coil assembly having a primary coil and a secondary coil for generating a high voltage for the ignition of the engine and being arranged so as to surround said first core member and so as to be surrounded by said separate parts of said second core member when assembled with the cylindrical sections thereof in contact with each other and the annular sections in contact along the inner periphery with said annular core member.

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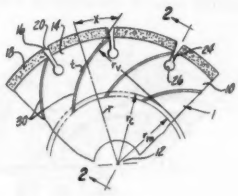
**4,516,560**

## ABRASIVE CUTTING WHEEL AND METHOD OF CUTTING ABRADABLE MATERIAL

**E. J. Cruickshank, Overland Park, Kans., and Joseph D. Ekland, Birmingham, Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.**

**Filed Jul. 29, 1982, Ser. No. 403,201**
**Int. Cl.³ B28D *1/04***
**U.S. Cl. 125—15** **7 Claims**



1. A rotatable cutting wheel for wet cutting of natural or artifical rock or rock-like material, comprising:

a generally circular disc-shaped drive core having a pair of opposite core faces and a plurality of circumferentially-extending and circumferentially-spaced support surfaces generally at the outer periphery thereof, a substantial number of said support surfaces having affixed thereto an abrasive cutting member capable of cutting abradable rock or rock-like material;

said core having a plurality of gullets, at least a substantial number of said gullets extending between a closed gullet end located a substantial radial distance inward of said support surfaces and an open gullet end defined by the space between adjacent pairs of said support surfaces;

said core having a plurality of vane means thereon for distributing a fluid coolant therethrough over at least one of said core faces, for directing said fluid coolant from at least one core face generally radially outwardly to at least some of said cutting members and for maintaining a quantity of said fluid coolant on at least said one core face as said core is rotating through the cut being made;

said vane means including a plurality of generally arcuate vanes circumferentially-spaced on at least one core face, said arcuate vanes curving outwardly from radial inward locations on at least said one core face that are approximately radially midway between said supporting surfaces and the axis of rotation of said core, each of said vanes being recessed relative to at least one core face and being in fluid communication with one of said gullets, said arcuate vanes extending in a generally radially outward and circumferential arcuate direction from said radial inward locations to said gullets, each of said arcuate vanes being configured so that a radius line from the core's axis to an intersection point on said vane approximately 40 percent inwardly along said vane from the periphery of said core forms an included angle of approximately 65° to approximately 85° with a tangent line that is tangent to said vane at said intersection point.

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**4,516,561**

## PORTABLE BATTERY POWERED BLOWER APPARATUS FOR FANNING CHARCOAL OR OTHER FUEL

**Karl-Heinz Stawski, Parkdale, and Philip W. Jensen, Hood River, both of Oreg., assignors to P D Manufacturing, Inc., Hood River, Oreg.**

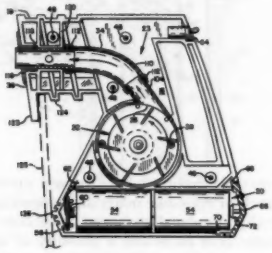
**Filed Sep. 30, 1982, Ser. No. 428,991**
**Int. Cl.³ A47J *37/00***
**U.S. Cl. 126—25 B** **8 Claims**

1. A portable battery powered blower apparatus for fanning charcoal or other fuel which is positioned within a rimmed fuel container comprising:

a housing having an upright body and a barrel having one end connected to an upper portion of the body, the barrel projecting outwardly from the upper portion of the body, the projecting portion of the barrel having a free end which is spaced from said one end of the barrel;

said body including a lower battery receiving compartment, an intermediate blower receiving chamber with an air inlet and an air outlet, and an upper air flow transition region;

a curved tubular conduit connected at a first end to the air



outlet and having its other or second end supported by the free end of the barrel so as to provide a curved air flow passageway from the intermediate chamber, through the air flow transition region and to the free end of the barrel;

a battery powered fan means positioned within the intermediate chamber for moving air from the air inlet, through the intermediate chamber and the tubular conduit, and from the free end of the barrel to the fuel;

said barrel having a plurality of lips projecting from the free end thereof, whereby the blower may be positioned on the rim of the fuel container during use.

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**4,516,562**

## ARRANGEMENT IN COMBUSTION CHAMBERS FOR BURNING SOLID FUEL

**Karl S. H. Hultgren, Rosengården, Kyrkv. 18, S-565 00 Mullsjö , Sweden**

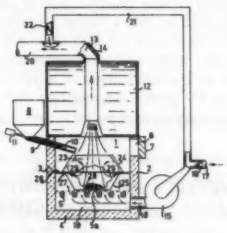
**PCT No. PCT/SE82/00248, § 371 Date Mar. 1, 1983, § 102(e) Date Mar. 1, 1983, PCT Pub. No. WO83/00373, PCT Pub. Date Feb. 3, 1983**

**PCT Filed Jul. 21, 1982, Ser. No. 485,115**

**Claims priority, application Sweden, Jul. 23, 1981, 81045163**

**Int. Cl.³ F24C *1/14***

**U.S. Cl. 126—77** **8 Claims**



1. An improvement in a solid fuel combustion chamber in which the combustion gases are recirculated; comprising peripheral walls surrounding the combustion chamber, fire bars located in the lower part of the combustion chamber for supporting said fuel in the central area thereof; a convection section arranged above said chamber; a flue-gas outlet communicating with said chamber by means of said convection section; fan means for supplying combustion gases to the combustion chamber; and a supply conduit extending from the pressure side of the fan means and having an outlet located in the combustion chamber beneath the fire bars; wherein the improvement comprises

an upwardly open first screening wall located above the fire bars in the combustion chamber, and in inwardly spaced relationship with the peripheral walls thereof, said first screening wall surrounding the central area upwardly adjacent the fire bars whereby gases delivered by the supply conduit discharging beneath the fire bars, and entering the combustion chamber through the fire bars, flow into both the space radially inward of said first screening wall and the space outward thereof; and

a downwardly open second screening wall which is located substantially above the first screening wall, the inner peripheral surface of the lower opening of the second wall being disposed radially outward of, and adjacent to, the outer peripheral surface of the upper opening of the first screening wall, so as to define between said adjacent peripheral surfaces of said first and second screening walls a gap which encircles said central area upwardly adjacent the fire bars in the combustion chamber, and which provides a gas supply opening for gases entering the combustion chamber through the fire bars and flowing outwardly of the first screening wall, said gap communicating with the space located radially inwardly of both said screening walls, so as to direct the flow of gases entering said gap along the inner surface of the second screening wall to cool the latter and to further direct said gases into circulation with the gases inside the first screening wall emanating from the fire, thereby generating blue-frame combustion within said screening walls; and

a baffle wall within said combustion chamber, extending radially from the periphery of the lower opening of the second screening wall to the surrounding wall of the combustion chamber to guide gases flowing externally of said first screening wall into said gap.

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**4,516,563**

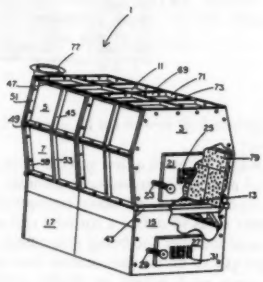
## HEATING DEVICE

**James B. De Larm, Summit Dr., Hague, N.Y. 12836**

**Continuation-in-part of Ser. No. 475,255, Mar. 14, 1983, abandoned. This application Feb. 24, 1984, Ser. No. 583,189**

**Int. Cl.³ F24D *9/00***

**U.S. Cl. 126—101** **12 Claims**



1. A heating device of assembled cast panel construction comprising: an upper front cast plate, upper and lower side cast panels, an upper back cast plate, top cast panels, grates, a lower front cast plate, lower side panels, a lower back cast plate, a flue and fire brick; said upper front cast plate, upper and lower side cast panels, upper back cast plate, top cast panels and grates defining a combustion chamber, said lower front cast plate, lower side panels and lower back cast plate defining an ashpit, said flue communicating with said combustion chamber to exhaust therefrom smoke, flue gases and products of com-

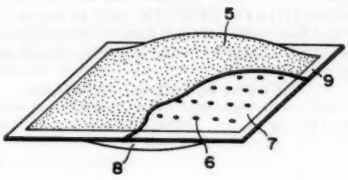
bustion, said upper side cast panels having upper flanges, lower flanges and lateral flanges, said lower side cast panels having upper flanges, lower flanges and lateral flanges, said lateral flanges of said upper side cast panels being square, said upper side cast panels being joined together at their said lateral flanges and presenting and defining flat surfaces inwardly facing said combustion chamber, said lateral flanges of said upper side cast panels being joined together with and in normal relationship with said upper front cast plate, said lateral flanges of said upper side cast panels being joined together with and in normal relationship with said upper back cast plate, said lateral flanges of said lower side cast panels being square, said lower side cast panels being joined together at their said lateral flanges and presenting and defining flat surfaces inwardly facing said combustion chamber, said lateral flanges of said lower side cast panels being joined together with and in normal relationship with said upper front cast plate, said lateral flanges of said lower side cast panels being joined together with and in normal relationship with said upper back cast plate, said upper and lower flanges of said upper side cast panels being tapered, said upper and lower flanges of said lower side cast panels being tapered, said lower flanges of said upper side cast panels being joined together with said upper flanges of said lower side cast panels, said lower side cast panels, as joined together, diverging upwardly and outwardly, said upper side cast panels, as joined together, converging upwardly and inwardly, said flat surfaces of said lower side cast panels and upper side cast panels, as joined together, defining obtuse interior angles, said top cast panels having front and rear flanges, and lateral flanges, said front and rear flanges of said top cast panels being square, said lateral flanges of said top cast panels being tapered, said top cast panels being joined together at their said front and rear flanges and presenting and defining a horizontal flat surface inwardly facing said combustion chamber, said front and rear flanges of said top cast panels being joined together with and in normal relationship with said upper front cast plate and upper back cast plate, respectively, said tapered upper flanges of said upper side cast panels being joined together with said tapered lateral flanges of said top cast panels, said upper side cast panels and top cast panels, as joined together, defining obtuse interior angles, said fire brick lying in place in corresponding diverging relationship against said inward flat surfaces of each of said diverging lower side cast panels to reflect heat upward, said converging inward flat surfaces of said upper side cast panels defining the upper half of said combustion chamber, said upper back cast plate having an upper half corresponding with said upper half of said combustion chamber, said upper half of said combustion chamber and said upper half of said upper back cast plate having corresponding middle regions, said middle region of said upper back cast plate mounting said flue for communication with said middle region of said upper half of said combustion chamber, said converging inward flat surfaces of said upper side cast panels forcing such heat to concentrate and maintain itself in said upper half of said combustion chamber above the creosote deposition temperature of the flue gases to prevent the formation of creosote, said horizontal flat surface of said top cast panels inwardly presented and facing said combustion chamber stopping such heat and further concentrating and maintaining such heat in said upper half of said combustion chamber for maximum heat exchange, a coil of layers of connected water tubes, and said coil of water tubes is disposed in said upper half of said combustion chamber, and said flue and its location at said middle region of said upper back cast plate cooperating in such stopping of such heat and further concentrating and maintaining such heat in said upper half of said combustion chamber by delaying the exhaustion of such heat from said upper half of said combustion chamber.

**4,516,564**

## HEAT GENERATING BODY

**Yasuhiko Koiso, Hiratsuka; Kenji Ohtsuka, Zama, and Shigeo Yahara, Hiratsuka, all of Japan, assignors to Japan Pionics Co., Ltd., Tokyo, Japan**

**Filed Sep. 14, 1982, Ser. No. 417,861**
**Claims priority, application Japan, Nov. 28, 1981, 56-191404**
**Int. Cl.³ F24J** *1/00*
**U.S. Cl. 126—263** **1 Claim**




1. A heat generating body comprising:
a heat generating composition for generating heat upon contact with oxygen;
a bag storing said heat generating composition, said bag comprising:
an air-permeable film with at least one window or holes, each of said holes having a diameter ranging between 0.05 and 50 mm; and
a microporous film covering and closing the window or holes, said microporous film having fine pores, each said pore having a diameter equivalent ranging between 0.005 and 5 microns; and
an outer cover with air-impermeability covering said bag, said outer cover being adapted to be removed from said bag when used.

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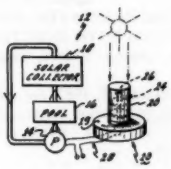
**4,516,565**

## SUN SENSING CONTROL DEVICE

**Milton Stone, 7121 Catalina St., Spring Hill, Fla. 33526**

**Filed Jan. 23, 1984, Ser. No. 573,055**
**Int. Cl.³ F24J** *3/02*
**U.S. Cl. 126—419** **17 Claims**




1. A sun sensing control device for controlling a solar heating system, comprising:
base means;
a hollow elongated housing being mounted on said base means in an upright disposition and having a sealed compartment therein confining fluid;
an electrical transducer mounted at least partially within said compartment and responsive to changes in the characteristics of the fluid confined within said compartment for generating an electric signal indicative of the presence of adequate solar radiation to cause the activation of the solar heating system; and
said housing being substantially longer in length than its transverse dimension to provide a small effective external exposed upper opaque area for the higher intensity solar radiation, and to provide a larger effective external exposed lower opaque area for the lower intensity solar

radiation, the external surfaces of said upper and lower areas having solar radiation absorbing color,

whereby the temperature of said fluid does not tend to become excessively elevated and said transducer is energized or de-energized only after a given time delay interval determined by the heat absorbing and releasing characteristics of the fluid respectively.

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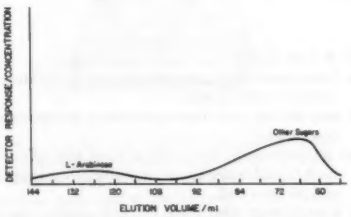
**4,516,566**

## SEPARATION OF ARABINOSE BY SELECTIVE ADSORPTION ON ZEOLITIC MOLECULAR SIEVES

**Chien C. Chao, Millwood, and John D. Sherman, Chappaqua, both of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.**

**Filed Dec. 30, 1982, Ser. No. 454,655**
**Int. Cl.³ C13K** *13/00*
**U.S. Cl. 127—46.3** **10 Claims**




**1**. A selective adsorption process for the separation of arabinose from a liquid mixture containing arabinose and at least one other aldose, which process comprises: (a) contacting said liquid mixture, at a pressure sufficient to maintain the mixture in a liquid phase, with an adsorbent composition comprising a BaX crystalline aluminosilicate zeolite, whereby arabinose is selectively adsorbed thereon; (b) removing the non-adsorbed portion of said liquid mixture from contact with the adsorbent composition; and (c) desorbing arabinose from said adsorbent composition by contacting said adsorbent composition with a desorbing agent and recovering desorbed arabinose.

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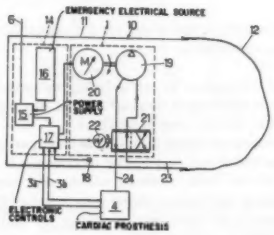
**4,516,567**

## SEQUENTIAL PNEUMATIC CONTROL DEVICE, SUPPLIED WITH ELECTRIC ENERGY

**René Veragen, Chatou, France, assignor to Sagem, Paris, France**

**Filed Jul. 25, 1983, Ser. No. 516,889**
**Claims priority, application France, Jul. 26, 1982, 82 13007**
**Int. Cl.³ A61M** *1/03*
**U.S. Cl. 128—1 D** **8 Claims**




**1**. A sequential pneumatic control device implantable in the human body and supplied with electrical energy, for use at least with a pneumatically operated cardiac prosthesis of the type formed by a biventricular monobloc assembly said control device comprising:

at least one housing forming an enclosure for a drive gas reserve, said housing comprised of an open rigid case having at least one opening therein and a wall, said wall being at least partially flexible and sealingly connected to said case such that said wall is subjected to flexing by the internal pressures of the human body and forms a flexible pocket, and such that the gas reserve is formed partly by said open rigid case and partly by said flexible pocket;

a motor mounted in said housing;

a pneumatic pump mounted in said housing and driven by said motor;

at least one main valve mounted in said housing for distributing the pressurized gas delivered by the pump to a device output port;

at least one electric motor mounted in said housing for actuating said valve;

a reference pressure detector;

a detector means for receiving a signal responsive to a cardiac condition; and

control means mounted in said housing and having inputs connected to said reference pressure detector and said detector means and having outputs connected to the motors of the pneumatic pump and of the valve.

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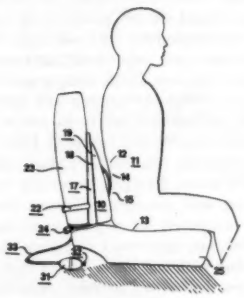
**4,516,568**

## PRESSURE EXERTING DEVICE

**Kern C. A. Baxter, 820 Sheffield Rd., Sheffield Lake, Ohio 44054, and Heinz-Gert Grm, 939 S. Main St., Amherst, Ohio 44001**

**Filed Jul. 22, 1983, Ser. No. 516,111**
**Int. Cl.³ A61F** *5/00;* **A47C** *27/08, 27/18*
**U.S. Cl. 128—70** **2 Claims**

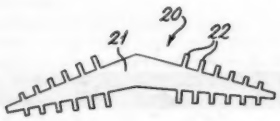


**1**. A pressure exerting device conformable to the contour of a body to exert pressure to the surface of the body in a preselected pounds per square inch pressure in a uniform manner throughout a preselected area of the surface of the body, said device comprising, a wedge shaped member of resilient material having a continuous surface, a modified U-shaped air bladder on said continuous surface with the base of the U-shaped bladder at the thick end of the wedge shaped member and with the legs of the U-shaped bladder extending along the opposite edges of said surface from said thick end substantially to the thin end thereof, means securing said bladder to said continuous surface, and hand operative means connected to said bladder to fill said bladder with air to a selected pressure while the divice is in pressure exerting contact with a body, said bladder expanding outwardly from said continuous surface a distance greater than either of said legs of said U-shaped bladder, and means for generating heat over a major portion of said continuous surface.

## 4,516,569
## INTRAMEDULLARY ORTHOPAEDIC DEVICES

David M. Evans, Farnham Common, and Barry O. Weightman, Thames Ditton, both of England, assignors to National Research Development Corporation, London, England

Filed May 5, 1983, Ser. No. 492,034
Claims priority, application United Kingdom, May 6, 1982, 8213032
Int. Cl.³ A61F 5/04
U.S. Cl. 128—92 BC 6 Claims




1. An internal orthopaedic fracture fixation device for a small bone comprising:
an elongate member of plastics material, said member having a rectangular overall cross-sectional shape defined by an opposed pair on major side faces in alternating disposition with an opposed pair of minor side faces;
said minor side faces being smooth;
said major side faces being formed over at least a major portion of the length thereof with at least two longitudinally adjacent sequences of fins;
each said sequence:
having the longitudinal direction of the fins therein extending transversely of said member,
being spaced longitudinally on said member from the next adjacent one of said sequences by a distance greater than the thickness of a respective one of said fins in the same direction, and
having the height of each said fin, directed outwardly from said member, being greater than said thickness;
said member being constructed and arranged to be secured by an interference fit, by longitudinal translation alone, into a preprepared, substantially complementary recess in said small bone; with such fit resulting from flexure of said fins of at least one corresponding said sequence thereof on each said major side face without necessarily causing substantial stripping of bone material from the wall of said recess, while said smooth faces act against rotation of said member in said recess.

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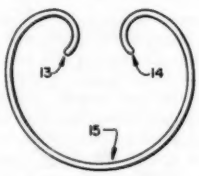
## 4,516,570
## PESSARY

Charles H. Taban, 50bis Ch des Falquet, 1223 Cologny, Switzerland

Filed Aug. 27, 1982, Ser. No. 412,162
Int. Cl.³ A61F 5/46
U.S. Cl. 128—130 1 Claim




1. A pessary comprising a unitary malleable metal core member, and a flexible sheath hermetically covering said core member, said sheath being formed from a bio-compatible polymeric material, said pessary having a first free end, a second free end and an intermediate portion between said free ends, and said pessary being formed into a non-closed curve wherein said intermediate portion has a generally semicircular shape, said semicircle having a center and a radius, and said free ends being curved inward generally toward said center, said free ends having radii of curvature smaller than the radius of said semicircle.

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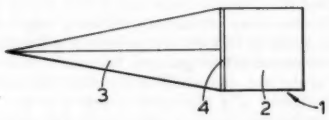
## 4,516,571
## MEDICAL DEVICE, ITS PREPARATION AND USE

Ian A. Buchan, Stansted Mountfitchet, England, assignor to Smith and Nephew Associated Companies p.l.c., England

Filed Mar. 8, 1984, Ser. No. 587,470
Claims priority, application United Kingdom, Mar. 10, 1983, 8306663; Nov. 9, 1983, 8329877
Int. Cl.³ A61F 13/00
U.S. Cl. 128—132 R 14 Claims




1. A device useful for the prophylaxis of pressure sores and which is removably attachable to the human body which device comprises a mobile moisture absorbing hydrophilic gel retained within a flexible elastomeric envelope which envelope has a body contacting surface which is a film having a moisture vapour transmission rate of greater than 300 $g/m^2$ 24 $hr^{-1}$ at 37° C. at 100% to 10% relative humidity difference said device being 5 to 25 mm thick.

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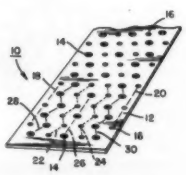
## 4,516,572
## PERFORATED CLOSED CELL PADDING MATERIAL

Allen P. Schlein, 107 Curtis Ter., Fairfield, Conn. 06430

Filed Mar. 11, 1983, Ser. No. 474,287
Int. Cl.³ A61L 15/00
U.S. Cl. 128—156 6 Claims



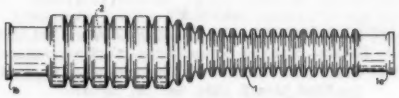

1. A padding material for an immobilizing orthopedic cast, said padding material consisting essentially of closed cell polyvinyl chloride foam in strip sheet form having a density as high as possible consistent with rendering said padding material conformable, resiliently compressible and elastic in the longitudinal direction, said foam being water repellent at least to the extent that water penetrates the foam with difficuly and the sheet surface which engages the human skin being macroscopically smooth and having the property of transporting moisture therealong, said foam material having perforations capable of passing moisture such as water and perspiration from the human skin therethrough by vapor transmission.

4,516,573

## DEVICE FOR CONNECTING A RESPIRATOR OR ANESTHESIA MACHINE TO A PATIENT

Andras Gedeon, Täby, Sweden, assignor to Gambro Engström AB, Bromma, Sweden

Filed Feb. 14, 1983, Ser. No. 466,097
Claims priority, application Sweden, Feb. 23, 1982, 8201131
Int. Cl.³ A61M *16/00*
U.S. Cl. 128—201.13 7 Claims



1. A device for connecting a Y-piece connected to the inspiration and expiration tubes of a respirator or an anesthesia machine to an endotracheal tube or the like adapted to be attached to a patient, comprising a hose which is continuous and flexible along substantially its whole length and which at one end thereof includes means formed in a manner to enable it to be connected, in gas-tight fashion, to said endotracheal tube or the like, and which at the other end thereof includes means formed in a manner to enable it to be connected, in gas-tight fashion, to said Y-piece coupled to the inspiration and expiration tubes of the respirator or anesthesia machine, and inside said flexible hose there is permanently incorporated, in the region thereof adjacent said other end, a heat and moisture exchanger consisting of a flexible, substantially uniformly gas permeable body of a felted fibrous material impregnated with a hygroscopic substance, said body filling substantially the whole of the cross-sectional flow area of the hose.

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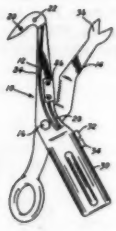
4,516,574

## TOOL FOR CASTRATING ANIMALS BY SEVERING THE SPERMATIC CORD BY SEARING OR CAUTERIZATION

Francis W. Hewes, Jr., Toponas, Colo. 80472

Filed Apr. 18, 1983, Ser. No. 485,667
Int. Cl.³ A61B *17/32, 17/38*
U.S. Cl. 128—303.1 7 Claims



1. A tool for castrating animals operating to sever the spermatic cord at least partly by searing or cauterization, comprising:

(a) a pair of arms pivotally connected together to operate in scissor-like manner;

(b) means on one of said arms for stripping the covering of the spermatic cord of an animal after the cord has been pulled out of the animal's body during castration,

(c) a heating area on one of said arms cooperating with said other arm upon closing of the arms to contact the spermatic cord of an animal between said arms to sever the cord at least partly by searing or cauterization, and (d) means for connecting said heating area to a source of energy.

4,516,575

## SURGICAL SCALPEL

Gregory J. Gerhard, Seattle, and William M. Graham, Burton, both of Wash., assignors to CooperVision, Inc., Palo Alto, Calif.

Filed Jun. 3, 1982, Ser. No. 384,596
Int. Cl.³ A61B *17/36*
U.S. Cl. 128—305 6 Claims

1. A surgical scalpel comprising:

a barrel having a longitudinal channel therethrough, the channel having first and second ends corresponding to first and second ends of the barrel;

a blade holder having a blade affixed to one end thereof, the blade holder being mounted for reciprocation in the channel between an extended position wherein the blade extends beyond the first end of the barrel and a retracted position;

adjustment means reciprocably mounted in the channel and coacting with the blade holder to adjustably reciprocate the blade holder between the extended and retracted positions, the adjustment means comprising a rod having intersecting axial and transverse bores extending therethrough, an expandable plug positioned in the transverse bore and having a bore therethrough that is oriented substantially coaxially with the axial bore in the rod, and means for moving the plug outwardly to engage the walls of the channel, the means for moving the plug comprising a tapered pin reciprocably mounted in the axial bore in the rod and the bore in the plug.

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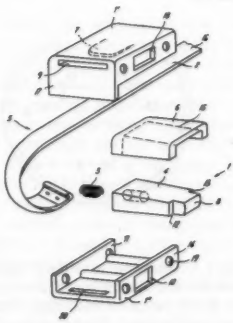
4,516,576

## TOURNIQUET STRAP OR BAND FOR RESTRICTING BLOOD FLOW, ESPECIALLY FOR TAKING BLOOD SAMPLES

Georg Kirchner, Markröningen, Fed. Rep. of Germany, assignor to Sanimed Vertrieb AG, St. Gallen, Switzerland

Filed Mar. 28, 1983, Ser. No. 479,445
Claims priority, application Switzerland, Apr. 1, 1983, 2011/82
Int. Cl.³ A61B *17/12*
U.S. Cl. 128—327 6 Claims



4. A clamping lock for use with a tourniquet containing a

strap having a longitudinal axis and which can be pulled through the clamping lock in the direction of said longitudinal axis of the strap and can be suspended in the clamping lock at one of its ends to form a stanching loop, said clamping lock having a longitudinal axis and comprising:

a wall;

a clamping wedge positioned transverse to said longitudinal axis of the clamping lock and transverse to said longitudinal axis of the strap which can be pulled through the clamping lock;

a spring acting upon said clamping wedge;

said clamping wedge being displaceable against the force of said spring and transversely with respect to the longitudinal axis of the strap and in its operative position being biased towards said wall of the clamping lock due to the action of said spring; and

an actuating element constituting a grip extension of said clamping wedge for releasing the biasing of said clamping wedge towards said wall of said clamping lock.

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**4,516,577**

## APPLICATOR TOOL

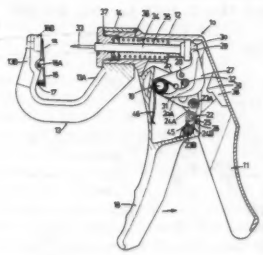
**Michael J. Scott, Fielding; Paul Slater, and Lawrence H. Brooshooft, both of Palmerston North, all of New Zealand, assignors to Allflex International Limited, Palmerston North, New Zealand**

**Continuation of Ser. No. 332,345, Dec. 18, 1981, abandoned. This application Apr. 2, 1984, Ser. No. 595,990**

**Claims priority, application New Zealand, Dec. 22, 1980, 195919**

**Int. Cl.³ A01K** *11/00*

**U.S. Cl. 128—330** **15 Claims**



1. An animal ear tag tool for applying an ear tag characterized by comprising a body including a first retention means for a first part of said tag, a second retention means for a second part of said tag, said first retention means including a first portion facing said second retention means and a second portion adjacent to said first portion, a pivoted lever pivotally mounted on said body, around a first pivot mount, means for transferring movement of said lever into movement of said second portion of said first retention means, said means for transferring being pivotal about a second pivot mount, said second pivot mount being movable in response to pivotal movement of said lever, said means for transferring being engaged with said second portion of said first retention means, guiding means comprising a cam surface and a cam follower, one of which is mounted with said means for transferring, and the other of which is fixed on said body, said cam surface having a profile which imparts variable speed motion to said second portion of said first retention means, said variable speed motion decreasing as said first portion approaches said second retention means.

**4,516,578**

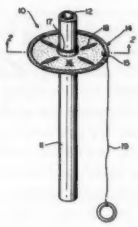
## RECTAL DEVICE AND METHOD OF INSERTING SAME

**Luther Shuffield, 4005 Twilight Dr., Fort Worth, Tex. 76116**

**Continuation-in-part of Ser. No. 429,815, Sep. 30, 1982, Pat. No. 4,471,782. This application Aug. 25, 1983, Ser. No. 526,410**

**Int. Cl.³ A61M** *26/00*

**U.S. Cl. 128—341** **26 Claims**



1. A rectal device comprising:

an elongated tube having a distal end and an outlet in the vicinity of the distal end, for introducing liquid into the anal opening through said outlet,

a diaphragm attached to the side of the tube, near the distal end thereof, said diaphragm normally extending outwardly, transversely to the tube axis, such that in use, with the tube inserted in the person's rectum, the diaphragm rests against the inside of the anal opening, interiorly of the anal spincter muscles, to prevent the escape of fluid being introduced,

said diaphragm having a relatively stiff outer ring and a more pliable imperforate central portion between the ring and the tube, the ring and central portion, taken together, being sufficiently stiff to maturally assume said transverse position, and sufficiently resilent to fold closely against the tube for insertion.

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**4,516,579**

## INTERFERENCE RECOGNITION CIRCUIT IN A HEART PACEMAKER

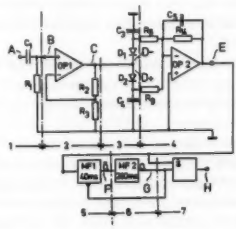
**Werner Irnich, 3 Birkenweg 60, D-6301 Wettenberg, Fed. Rep. of Germany**

**Filed Aug. 26, 1983, Ser. No. 527,177**

**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1982, 3232478**

**Int. Cl.³ A61N** *1/00*

**U.S. Cl. 128—419 PG** **20 Claims**



1. A synchronizable heart pacemaker

comprising in combination

a timing circuit for generating a stimulating impulse after an expected time interval,

differentiating means for receiving signals,

interference recognition means connected to the output of said differentiating means, and including

a testing stage for each signal, an output signal normally

appearing on an output of said testing stage, said testing stage including a peak detector circuit storing a positive maximum value and a negative maximum value of each signal differentiated by an adder which further acts as an amplifier and which forms the difference of both positive and negative maximum values, and a comparator postcoupled with one input thereof to said adder and with another input thereof to a reference voltage,

a discriminator postcoupled to the testing stage, said discriminator stage generating a time interval corresponding approximately to a time duration of the QRS complex of a heart-action signal, and including

checking means for checking for the presence or absence of said output signal after said time interval, and

decision means for recognizing said output signal in the presence thereof within said time interval either as an interfering signal, and thereafter rendering said interfering signal ineffective, or recognizing said output signal as said heart-action signal and passing said heart-action signal to said timing circuit.

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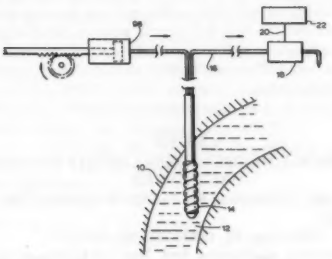
**4,516,580**

## CONTINUOUS BLOOD GAS MONITORING

**Michael L. Polanyi, Vaughn Hill Rd., Bolton, Mass. 01740**

**Filed Dec. 29, 1981, Ser. No. 335,391**
**Int. Cl.³ A61B 5/00**
**U.S. Cl. 123—632** **12 Claims**



1. A method for measuring the concentration of components of a fluid mixture comprising

contacting one side of a membrane permeable to the component to be determined with a sample of the fluid mixture to be analyzed;

contacting the second side of the membrane with a test fluid for the component to be determined with the test fluid contacting the membrane according to a first setting of a relevant parameter;

contacting successively the second side of the membrane with the test fluid for the component to be determined with the test fluid contacting the membrane according to a second setting of a relevant parameter;

analyzing the resultant properties of the test fluid having contacted the membrane according to the first setting of a relevant parameter;

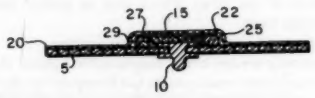
analyzing the resultant properties of the test fluid having contacted the membrane according to the second setting of a relevant parameter, for establishing the concentration of the component to be determined from the resulting analytical values of the test fluid obtained from both analyzing the resultant properties of the test fluid having contacted the membrane according to both settings of a relevant parameter.

**4,516,581**

## EKG ELECTRODE

**Robert W. Sessions, Burr Ridge, Ill., assignor to Ferris Manufacturing Corp., Burr Ridge, Ill.**

**Filed Jun. 20, 1983, Ser. No. 506,043**
**Int. Cl.³ A61B 5/04**
**U.S. Cl. 128—639** **7 Claims**




1. In an EKG electrode with a body portion to which is attached a conducting contact member in electrical contact with a jell impregnated foam member, an improvement comprising:

means for surrounding said foam member positioned so as to be in physical contact with a part of said body portion as well as in electrical contact with said foam member, and wherein;

said means surrounding comprises a conductive annular ring formed of a selected medical grade plastic.

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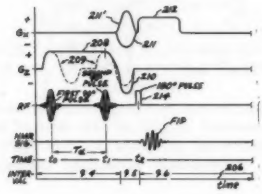
**4,516,582**

## NMR BLOOD FLOW IMAGING

**Rowland W. Redington, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed May 2, 1983, Ser. No. 490,605**
**Int. Cl.³ A61B 5/02**
**U.S. Cl. 128—653** **19 Claims**




1. A method for producing a detectable signal for imaging related to the flow rate of fluid moving within one or more confined pathways in an object using NMR pulse sequences, said method comprising the steps of:

exciting atomic nuclei within a selected planar slab portion of said object by applying a 90° selective RF pulse to said object, said slab being of predetermined thickness and oriented at an angle to each of said pathways respectively;

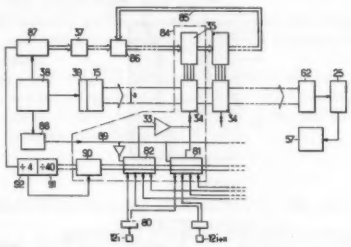
exciting atomic nuclei within substantially the same selected planar slab portion a second time after a predetermined time delay by applying a second 90° selective RF pulse to said object said time delay being directly proportional to said slab thickness and inversely proportional to said fluid flow rate so as to generate an NMR signal whose amplitude is related to the quantity of liquid which flowed into the slab via said pathways during said time delay said selective pulses being applied simultaneously with at least one gradient pulse in a direction perpendicular to said planar slab; and

detecting said NMR signal from said planar slab.

## 4,516,583
## ULTRASONIC ECHOGRAM PROBE AND SECTOR ECHOGRAPHIC SCANNING DEVICE

**Bruno Richard, Brunoy, France, assignor to Centre National de la Recherche Scientifique, Paris, France**

**Filed Jul. 7, 1982, Ser. No. 396,078**
**Claims priority, application France, Jul. 8, 1981, 81 13445**
**Int. Cl.³ A61B *10/00***
**U.S. Cl. 128—660** **6 Claims**



1. An electronic scanning ultrasonic echography device for exploration of an organ or other internal anatomical structure, said device comprising:

a probe having an external surface adapted for contact with a surface of a body to be examined and carrying a linear array of N identical transducer elements, where N is an integer, distributed at equal intervals along a part circular line having the convex side thereof facing toward said external surface of said probe,

means for storing at least one distribution of time delays associated with n successive transducer elements, where n is a number less than N, corresponding to focusing at a predetermined distance from the center of said part circular line which is substantially larger than the radius of said part circular line,

signal transmitting means and signal receiving means and switch means, cooperating with said storing means, for providing connection of a first group of n successive transducer elements to said signal transmitting means and signal receiving means with said distribution of time delays and thereafter providing connection of successive groups of n transducer elements at an increasing angular distance from said first group in accordance with a predetermined sequence, so as to provide sector scanning,

said signal transmitting means comprising a pulse generator, and means for delivering on a plurality of channels, from each said pulse of said pulse generator, a plurality of time pulses delayed by a predetermined time $\tau$ and by multiples of $\tau$,

said switch means being arranged to control a plurality of amplifiers each associated with one of said transducers in response to a said pulse appearing on the channel associated with that amplifier, as selected by the storing means, and to direct the reflected signal from said one of said transducers to the associated channel,

and said signal receiving means comprising a plurality of time delay elements, each connected to a particular one of said channels, for passing a signal received on that channel with the time delay associated with that channel.

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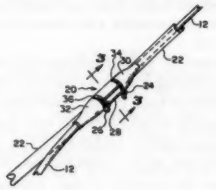
## 4,516,584
## SUTURE COLLAR

**Leonard M. Garcia, Severna Park, Md., assignor to Cordis Corporation, Miami, Fla.**

**Filed Jan. 7, 1983, Ser. No. 456,532**
**Int. Cl.³ A61N *1/04***
**U.S. Cl. 128—785** **10 Claims**

1. A suture collar for use with a pacing lead body, said collar comprising a generally cylindrical body having opposite ends and having a throughbore therethrough for receiving a pacing lead body, said cylindrical body including a middle barrel portion and tapering end portions, each of which taper from the barrel portion to one of said ends, said barrel portion being separated from said tapering end portions by first and second suture receiving annular grooves, and said barrel portion having at least two generally longitudinally extending slits therein, each extending generally radially inwardly from the outer surface of said barrel portion to said throughbore to facilitate squeezing of the cylindrical body around a lead body when a suture is tied in one of said grooves.



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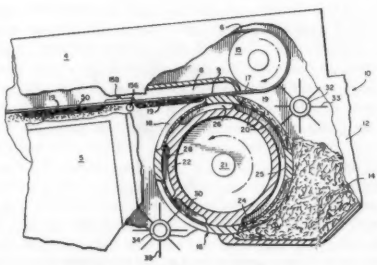
## 4,516,585
## METHOD AND APPARATUS FOR PRODUCING A MULTIPLE-BLEND CIGARETTE

**Jesse R. Pinkham, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Sep. 2, 1982, Ser. No. 415,193**
**Int. Cl.³ A24C *5/18***
**U.S. Cl. 131—84.3** **1 Claim**



1. A cigarette-making machine for producing a multi-blend segmented cigarette comprising:

(a) means for conveying tobacco defining a tobacco receiving surface;

(b) means for retaining said tobacco on said tobacco conveying means;

(c) first blend supply means for supplying a first blend adjacent said tobacco conveying means;

(d) forming means adjacent to said tobacco conveying means for receiving and forming portions of said first blend at spaced intervals and transporting said formed portions into contact with said tobacco conveying means;

(e) means for retaining said formed portions on said and forming means between said first blend supply means and said tobacco conveying means and transferring said formed portions to said tobacco conveying means;

(f) second blend supply means located adjacent said tobacco conveying means and subsequent to said forming means for supplying a second blend to said tobacco conveying means, said second blend being deposited on said tobacco conveying means in the spaced intervals between said formed portions and covering said formed portions carried on said tobacco conveying means to form a longitudi-

nal layer of said second blend having discrete portions of said first blend at spaced intervals therein;

(g) means for trimming said longitudinal layer to form a trimmed layer of uniform thickness by removing only portions of the second blend;

(h) rod-forming means for receiving said trimmed layer and forming a tobacco rod with a wrapper;

(i) cutter means for cutting said wrapped tobacco rod into segments; and

(j) control means for synchronizing said cutter means with said rod conveying means to cut the tobacco rod in the intervals between each portion including a sensing device located adjacent to said tobacco conveying means subsequent to the transfer of said portions to said tobacco conveying means and prior to said second blend supply means for detecting the location of each formed portion on said tobacco conveying means.

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**4,516,586**

## REAMER FOR PIPE

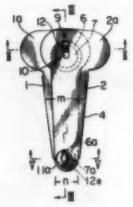
**Toshio Koito; Tetsuo Koito, and Miyoko Koito, all of Tokyo, Japan, assignors to Yugen-gaisha Koito-Seisakusho; Yugen-gaisha Koito-Seimitsu and Yugen-gaisha Koito-Denki, all of Tokyo, Japan**

**Filed May 20, 1983, Ser. No. 496,714**

**Claims priority, application Japan, Jun. 25, 1982, 57-94524[U]**

**Int. Cl.³ A24F** *9/10*

**U.S. Cl. 131—246** **9 Claims**



**1**. A pipe reamer comprising a pair of reamer plates, each of said plates having a pair of end sections, pivotal means at one end section of each of said blades for pivotably mounting said pair of plates for pivotal movement in an increasing angular direction and in a decreasing angular direction, the other end section of one of said plates having a circular mounting opening, an adjusting member having a circular part rotatably disposed in said mounting opening, said adjusting member having a first part eccentrically disposed relative to said circular part, the other end section of said other plate having an adjusting hole, a clamp member justaposed to said other plate and having a second part passing into said adjusting hole, thread means on said first and second parts threadably engaging said first and second parts, said adjusting member being rotatable in said mounting opening to eccentrically displace said first part so that the threadedly engaged second part is concurrently displaced, whereby the displaced second part engages said adjusting hole to pivot said other plate relative to said first plate, said thread means being constructed such that application of an external force tending to pivot said two plates in said decreasing angular direction tightens said thread means such that said adjusting member and said clamp member increasingly wedge said two plates therebetween to thereby resist pivoting of said two plates in said decreasing angular direction.

**4,516,587**

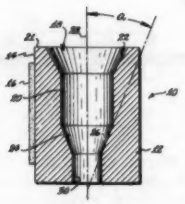
## CIGARETTE EXTINGUISHER

**Victor R. Eastridge, and John C. Milani, both of P.O. Box 3291, Scottsdale, Ariz. 85257**

**Filed May 23, 1983, Ser. No. 496,859**

**Int. Cl.³ A24F** *13/18*

**U.S. Cl. 131—256** **10 Claims**



**1**. A cigarette extinguishing device comprising:

(a) a housing having an upper surface and an opposed lower surface with a bore extending therebetween;

(b) said housing configured to provide said bore with a cylindrical bore portion the upper end of which opens onto the upper surface of said housing, said cylindrical bore portion adapted to removably receive the substantially cylindrical body portion of a cigarette to be extinguished;

(c) said housing configured to form a frusto-conical bore portion at the lower end of said cylindrical bore portion for nestingly receiving and circumscribingly engaging at least a portion of the conical surface of the burning tip of the cigarette removably receivable in said cylindrical bore portion; and

(d) said housing configured to form a reduced diameter cylindrical bore portion which extends from said frusto-conical bore portion and opens onto the lower surface of said housing.

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**4,516,588**

## PROCESS FOR IMPROVING THE FILLING CAPACITY OF TOBACCO, IN PARTICULAR CUT TOBACCO LEAF

**Gert Rudolph, Hamburg, and Günther Rodemeyer, Seevetal, both of Fed. Rep. of Germany, assignors to B.A.T. Cigaretten Fabriken G.M.B.H., Hamburg, Fed. Rep. of Germany**

**Filed Dec. 29, 1982, Ser. No. 454,373**

**Claims priority, application Fed. Rep. of Germany, Jan. 8, 1982, 3200305**

**Int. Cl.³ A24B** *3/18*

**U.S. Cl. 131—291** **9 Claims**

**1**. In a process for improving the filling capacity of tobacco for use in cigarettes or cigars in which raw tobacco is moistened, stripped and cut and, after impregnation with a vaporizable expanding agent, is subjected to an expansion process, the improvement which comprises adding an anti-oxidant, in the amount of 0.0001% to less than 0.1% by weight relative to the raw tobacco weight, to the tobacco before said expansion.

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**4,516,589**

## NON-COMBUSTIBLE CARBONIZED CIGARETTE FILTERS

**Norman B. Rainer, Richmond, and Charles S. McClung, Prince George, both of Va., assignors to Philip Morris Incorporated, New York, N.Y.**

**Filed May 18, 1982, Ser. No. 379,556**

**Int. Cl.³ A24D** *3/06, 1/18*

**U.S. Cl. 131—331** **8 Claims**

**1**. A non-combustible filter for a smoking article, comprising up to about a 40 mm length of a carbonized material prepared by:

(a) contacting a sheet of porous cellulosic web material with a film-forming aqueous solution of an inorganic salt selected from the group consisting of alkali metal and ammonium silicates, carbonates, hydrophosphites, diphosphites, phosphites, hypophosphites, orthophosphates, diphosphates, triposphates, polymetaphosphates, peroxymonophosphates, peroxydiphosphates, orthoborates, metaborates, tetraborates and mixtures thereof so that the web material contains at least about 1% of the salt on a dry weight basis; then

(b) laterally gathering and compressing the cellulosic material into a substantially cylindrical coherent bundle; and then

(c) pyrolyzing the cellulosic material in an inert atmosphere at a temperature of at least about 700° C. such that at least about 15% of the initial weight of the cellulosic material remains after pyrolysis.

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**4,516,590**

## AIR-CURED BRIGHT TOBACCO FILLER, BLENDS AND SMOKING ARTICLES

**Daniel M. Teng, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.**

**Filed Nov. 26, 1982, Ser. No. 444,928**
**Int. Cl.³ A24B *3/14***
**U.S. Cl. 131—352** **18 Claims**

1. A tobacco filler for smoking articles, comprising air-cured bright tobacco filler having, on a dry weight basis, a total reducing sugar content within the range of from 0 to about 6%, a chlorogenic acid content within the range of from 0 to about 0.4%, a rutin content within the range of from 0 to about 0.2%, a hot water solubles content within the range of from about 45 to about 55%, a total ash content within the range of from about 12 to about 26%, a combined proline and threonine content within the range of from 0 to about 1 mg/g, a combined aspartic acid and asparagine content with the range of from about 0.5 to about 1.7 mg/g, and a combined glutamic acid and glutamine content within the range of from about 0.5 to about 1.6 mg/g.

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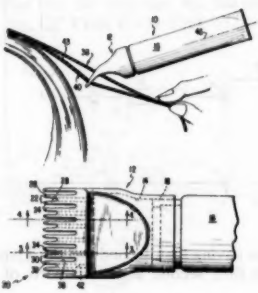
**4,516,591**

## HIGHLIGHTING APPLICATOR

**Melvin C. Hierholzer, 4213 Beard, Corpus Christi, Tex. 78413**

**Filed Mar. 14, 1983, Ser. No. 475,028**
**Int. Cl.³ A45D *24/22*; B43K *1/06***
**U.S. Cl. 132—88.7** **18 Claims**



1. An applicator for distributing a hair treating material onto less than all of the hair of an individual, comprising

a body having a chamber therein and including means for attaching the body to a material supply container in communication with the chamber; and

a comb structure carried by the body for distributing the material, including

a plurality of first teeth pairs having therebetween roots of a first depth and a plurality of second teeth pairs having therebetween roots of a second depth, different from the first depth, and

conduit means commuicating with the chamber and opening through the roots between at least some of the first teeth pairs, there being no communication between the chamber and the space between the second teeth pairs.

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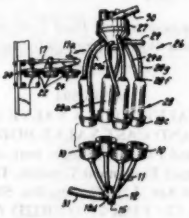
**4,516,592**

## MILKER UNIT WASHER

**Per-Erik Schultz, Aelvsjoe, Sweden; Mofazzal H. Chowdhury, Kansas City, Mo., and Clayton B. Neff, Shawnee, Kans., assignors to Alfa-Laval, Inc., Tumba, Sweden**

**Filed Feb. 29, 1984, Ser. No. 584,893**
**Int. Cl.³ A01J *5/00*; B08B *3/04, 9/00***
**U.S. Cl. 134—169 C** **12 Claims**



10. In a washing device for a milker unit, the combination of four teat cup receivers each having a receiving space and a flexible annular flange defining an opening dimensioned for entrance of a teat cup into said space, a distributor forming a chamber and having a valve seat and a washing liquid inlet leading to the chamber through said seat, tubes through which the respective receivers communicate with said chamber and from which said distributor is suspended, a valve element in said chamber operable by a vacuum in said inlet to close said inlet by engaging said seat, said valve element being movable in response to a vacuum in said receiver spaces to disengage said seat and open said inlet, a plurality of holders for the respective receivers and a bracket on which said holders are mounted, each holder including a generally annular member and a rod on which said annular member depends from the bracket, each annular member having a part of greater diameter than said receiver opening and engageable with said receiver flange from within said space to support the receiver, said annular member being dimensioned for insertion through said receiver opening by flexing of said receiver flange.

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**4,516,593**

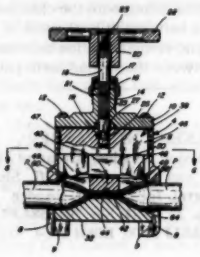
## PLUMBING REPAIR DEVICE AND METHOD

**Anthony Muto, 2817 Aberdeen Ave., Ashtabula, Ohio 44004**

**Filed May 14, 1984, Ser. No. 609,827**
**Int. Cl.³ F16K *43/00*; F16L *55/14***
**U.S. Cl. 137—15** **9 Claims**

9. A method for selectively controlling the fluid flow through a deformable pipe section made from a readily deformable materials such as copper or the like, said method comprising supplying a portable fluid flow control device to a predetermined selected area of said pipe section to be isolated, said device including a unitary piercing member having an integral pair of laterally spaced, oppositely disposed blade-like elements disposed within a hollow cavity of said control device for vertical movement toward and away from said pipe section so as to form by a simultaneous piercing action lengthwise extending openings therein, said piercing member occupying generally the full transverse area of said cavity during said vertical movement of said piercing member, and rib means being disposed relative to said blade-like elements for substan-

tially simultaneously crimping said pipe section into a closed condition, intermediate said openings thereof to automatically



close-off and then re-establish fluid flow around the crimped area upon formation of said openings by said piercing member.

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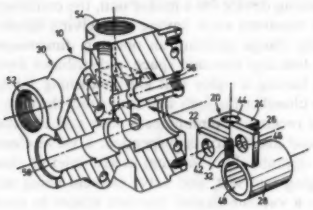
**4,516,594**

## MULTI-PART VALVE WITH A VALVE SEAT SKELETON AND CAST VALVE BODY

**John C. Martin, and Paul H. Martin, both of Toronto, Canada, assignors to Diesel Equipment Limited, Toronto, Canada**

**Filed Apr. 3, 1984, Ser. No. 596,311**
**Int. Cl.³ F16K *27/00*; B22D *19/00***
**U.S. Cl. 137—15** **8 Claims**



1. A multi-port valve comprising:

(a) a valve seat skeleton comprising a plurality of wear-resistant members each having a wear-resistant operative surface formed thereon, said wear-resistant members being secured to one another to retain said wear-resistant operative surfaces thereof in a predetermined fixed arrangement,

(b) a valve body of readily castible material cast about said skeleton, said valve body having a plurality of valve passages formed therein, at least one of said valve passages opening to expose each wear-resistant operative surface for engagement by a movable valve component mounted in each valve passage to bear against and move relative to each wear-resistant operative surface in use.

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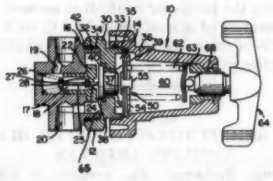
**4,516,595**

## GAS PRESSURE REDUCING REGULATOR AND ADAPTER

**Byron H. Acomb, Florence, S.C., assignor to Union Carbide Corporation, Danbury, Conn.**

**Filed Jul. 5, 1983, Ser. No. 510,732**
**Int. Cl.³ F16K *13/04***
**U.S. Cl. 137—73** **7 Claims**

1. A gas pressure reducing regulator in combination with an adapter for minimizing the potential danger from the occurrence of a regulator burnout comprising: a regulator body having an inlet opening adapted to be connected to a source of relatively high pressure gas containing oxygen; an outlet opening for discharging said gas at a relatively controlled reduced pressure; a valve chamber in said regulator body; a valve assembly mounted in said valve chamber and having a valve nozzle, a valve seat and a slidable valve member; a push pin extending from said slidable valve member through said valve seat; a bonnet having a bonnet chamber; a diaphragm assembly having a flexible diaphragm for forming a diaphragm chamber between said bonnet chamber and said valve chamber and with said adapter comprising: connecting means for removably coupling said regulator body to said bonnet and for forming an isolation chamber for isolating said valve assembly from said



diaphragm assembly in response to a regulator ignition, said isolation chamber being in open communication with said diaphragm chamber during normal operation of said regulator; and a free floating plunger slidably mounted in said connecting means and extending between said push pin and said diaphragm assembly for moving said diaphragm assembly in response to the movement of said push pin during normal operation of said regulator and for sealing off said isolation chamber from said diaphragm chamber in response to an ignition in the regulator body.

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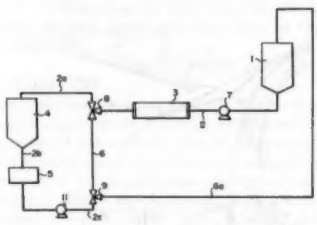
**4,516,596**

## SYSTEM FOR CLEANING A THREE-WAY VALVE

**Ko Sugisawa; Kazuya Sekiguchi; Masao Taguchi; Masayuki Nakatani, and Hitoshi Iwata, all of Higashiosaka, Japan, assignors to House Food Industrial Company, Ltd., Osaka, Japan**

**Filed Jun. 22, 1984, Ser. No. 623,374**
**Claims priority, application Japan, Jun. 22, 1983, 58-95955[U]**
**Int. Cl.³ B08B *9/06***
**U.S. Cl. 137—240** **6 Claims**



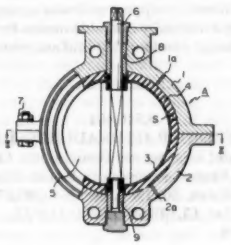
1. In a system having first, second and third pipes connected respectively to first, second and third ports of a three-way valve;

a system for cleaning said three-way valve comprising a by-pass pipe adapted to be connected at its one end to one of the second and third ports after disconnecting the associated one of the second and third pipes therefrom and at its other end to the other of the second and third pipes, whereby a cleaning fluid can be made to flow in either direction between and only between said first pipe and said other of the second and third pipes depending on the position of the valve.

## 4,516,597
## ANTICORROSIVE BUTTERFLY VALVE

Tomoyuki Ueda, Nobeoka, Japan, assignor to Asahi Yukizai Kogyo Co., Ltd., Japan

Filed Apr. 1, 1983, Ser. No. 481,388
Int. Cl.³ F16L *27/00*
U.S. Cl. 137—314 6 Claims



1. An anticorrosive butterfly valve comprising a valve body, a fluid passageway within said valve body, and a valve disk mounted for rotation within said passageway about an axis located at right angles to the axis of the passageway, the valve body being adapted to carry an annular valve seat ring which projects within the interior of said passageway, said valve disk being composed of polytetrafluoro ethylene and said valve seat ring being formed of an elastic layer lined by a polyvinylidene difluoride layer, said elastic layer of the valve seat ring being made from a material having a higher moisture permeability than that of polyvinylidene difluoride; on the outer surface of the valve seat ring, circular grooves are provided annularly around openings for receiving the upper and lower ends of a valve stem of the valve disk; on the outer surface of the elastic layer facing the valve body, a plurality of parallel annular grooves are provided, said circular and parallel grooves being communicated with each other such that a continuous fluid path is formed in the outer surface of the valve seat ring; and a plurality of vents for moisture are passed through the wall of the valve body substantially in radial directions toward the axis of the valve body and are communicated with said circular and parallel grooves.

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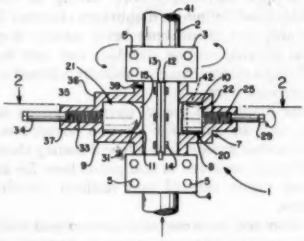
## 4,516,598
## WELL SAFETY VALVE

Adam E. Stupak, R.D.-1, Box 395-G, Toledo, Oreg. 97391

Filed Oct. 24, 1983, Ser. No. 544,982
Int. Cl.³ F16K *43/00*; F16L *55/10*
U.S. Cl. 137—318 16 Claims



1. A safety valve of the type adapted to be mounted on a submerged section of a well pipe including:

(a) a pair of vertically spaced positioning blocks adapted to be mounted on a submerged section of well pipe;

(b) a collar adapted to be rotatably mounted on the well pipe between the pair of positioning blocks, said collar being formed with a pair of diametrically opposed fluid tight chambers adapted to communicate with the well pipe when mounted on said pipe;

(c) cutter means movably mounted in one of the collar chambers for cutting an opening in the well pipe, with said cutter means being constructed and arranged to be operated externally of said collar; and

(d) plug means movably mounted in the other of the collar chambers for extending into the bore of the well pipe through the opening formed therein by the cutter means after rotation of the collar on the well pipe for sealing said pipe bore to prevent flow of a fluid therethrough.

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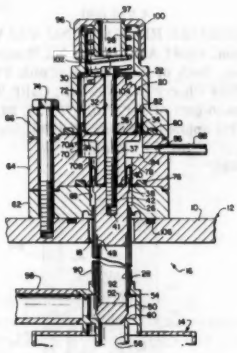
## 4,516,599
## VALVE MECHANISM FOR LOW TEMPERATURE APPLICATIONS

Shyunichi Nakaya, Kawasaki, and Hiroyuki Nakamura, Yokohama, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa, Japan

Filed Feb. 23, 1982, Ser. No. 351,509
Claims priority, application Japan, Feb. 27, 1981, 56-28213
Int. Cl.³ F16L *7/00*
U.S. Cl. 137—375 15 Claims



1. A valve mechanism for low temperature applications comprising:

an outlet for a low temperature fluid;

valve means for opening and closing said outlet;

an axially movable rod having one end secured to said valve means and the other end extending into a normal temperature zone;

means for holding said rod;

resilient means located in said normal temperature zone for urging said rod toward a position wherein said outlet is closed by said valve means and for compressing in response to pressure of said low temperature fluid against said valve means in excess of a desired pressure value to permit said rod and said valve means to be displaced to open said outlet and allow excess pressure to be released; and

means for selectively applying a pressurized fluid to said rod to exert a force counter to said resilient means, whereby said rod and valve means may be displaced and said outlet opened;

said means for selectively applying a pressurized fluid to said rod comprising a pressure chamber defined by the outer surface of said rod, the inner surface of said rod holding means and first and second flexible partitions sealingly extending between said rod and said rod holding means, said pressure chamber having a larger diameter end away from said valve means sealed by said second flexible partition and a smaller diameter end toward said valve means sealed by said first flexible partition, and gas passage

means for introducing a pressurized fluid into said pressure chamber;

said rod comprising first, second and third rod portions axially connected to each other, said second flexible partition being sandwiched between said first and second rod portions and said first flexible partition being sandwiched between said second and third rod portions, the end of said second rod portion oriented in the direction of the force exerted by said resilient means having a smaller diameter than the end of said second rod portion oriented in the direction counter to the direction of the force exerted by said resilient means;

said rod holding means comprising first, second and third rod holding members axially connected to each other, said first flexible partition being sandwiched between said first and second rod holding members and said second flexible partition being sandwiched between said second and third rod holding members, said second rod holding member comprising an axial through bore having a smaller diameter at its end oriented in the direction of the force exerted by said resilient means and a larger diameter at its end oriented counter to the force exerted by said resilient means.

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**4,516,600**

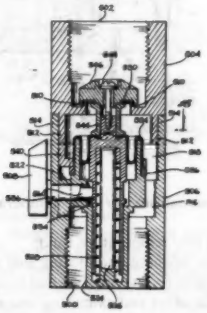
## PRESSURE REGULATING VALVES

**Oded E. Sturman, 18241 Andrea Cir. N.; Benjamin Grill, 9819 Etiwanda Ave., both of Northridge, Calif. 91329, and Lynn Harrison, 23554 Cherry St., Newhall, Calif. 91321**

**Continuation-in-part of Ser. No. 378,139, May 14, 1982, abandoned. This application Mar. 2, 1984, Ser. No. 585,379**

**Int. Cl.³ F16K** *31/14*

**U.S. Cl. 137—495** **9 Claims**



1. A pressure regulating valve for receiving fluid from a fluid source and controllably delivering fluid at a regulated pressure comprising first and second housing members, each having first and second ends, said first housing member having an inlet port at said first end thereof, said second housing member having an outlet port at said first end thereof and a valve seat having a valve seat opening therethrough adjacent said second end and facing said first end thereof, said first and second housing members being joined adjacent said second ends thereof so that said inlet port, said outlet port and said valve seat are all coaxial, said first housing member having a spring housing integral therewith and supported internally to said first housing member on at least one support so as to allow fluid flow therebetween, said spring housing being closed adjacent the inlet port end thereof, a compression spring within said spring housing, a valve closure assembly fitting at least in part within said spring housing and extending through said valve seat opening, said valve closure assembly having a valve closure member facing said valve seat, said valve closure assembly being moveable along the axis of said valve seatbetween a closed position with said valve closure member engaging said valve seat and an open position with said valve closure member displaced from said valve seat and toward said second port, said compression spring urging said valve closure assembly to said open position, a diaphragm sealingly fastened adjacent its outer periphery to said spring housing and sealingly fastened adjacent its inner periphery to said valve closure assembly, thereby sealing said spring housing and isolating said spring from fluid in said inlet and outlet ports, and cam means extending radially through said first housing means, said at least one spring housing support and said spring housing, said cam means being a manually operable means for engaging said valve closure assembly and forcing said assembly to said closed position.

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**4,516,601**

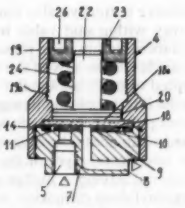
## MINING CYLINDER HYDRAULIC SLIDE VALVE

**Roger Chanal, Saint Etienne, and Daniel Cotte, Chambon Feugerolles, both of France, assignors to Bennes Marrel, France**

**Filed Jun. 30, 1982, Ser. No. 393,977**

**Int. Cl.³ F16K** *17/04, 31/122*

**U.S. Cl. 137—510** **10 Claims**



1. A hydraulic slide valve for a cylinder of a mine prop comprising:

valve body means having a valve housing receiving surface, a recess with a recess surface, first passage means communicating with said recess through said recess surface, hub means upstanding a hub height above said recess surface along a central axis, said hub means having an annular seating surface at said hub height and second passage means therethrough, said first passage means adapted to communicate with a source of fluid pressure and said second passage means adapted to communicate with a fluid drain means;

valve housing means having a bottom end and a valve body end, said valve body end comprising a valve body receiving surface secured to said valve housing receiving surface of said valve body means, said valve housing means further comprising a stepped diaphragm bore and a piston bore, said stepped diaphragm bore having an internal seating shoulder and defining a diaphragm chamber facing said recess, and said piston bore being axially disposed between said internal seating shoulder and said bottom end and defining a piston chamber radially inboard of said stepped diaphragm bore;

resilient circular diaphragm means having a piston side, a sealing side, and an outer rim portion secured in said diaphragm chamber against said internal seating shoulder;

piston means slidably received in said piston bore for axially engaging said piston side of said resilient circulr diaphragm means;

spring means disposed between said bottom end and said piston means urging said piston means against said piston side of said resilient circular diaphragm means to bias said sealing side of said resilient circular diaphragm means to normally seat against said annular seating surface of said valve body means of said hub means and thereby close said second passage means from said said recess, whereby said second passage means are sealed until said fluid pressure communicated to said first passage means exceeds a predetermined fluid pressure and to allow said fluid pres-

sure when in excess of said predetermined fluid pressure to urge said sealing side of said resilient circular diaphragm means away from said annular seating surface to thereby open said second passage means and communicate said recess and said first passage means with said fluid drain means until said fluid pressure is reduced below said predetermined fluid pressure;

outer washer means disposed in said recess comprising an outer member secured to a resilient inner sealing member, said outer member securing said outer rim portion of said resilient circular diaphragm means against said internal seating shoulder and said resilient inner sealing member haaving a first and a second sealing lip with an axial separation therebetween, said first sealing lip continually sealingly engaging said recess surface of said recess and said second sealing lip continually sealingly engaging said sealing side of said resilient circular diaphragm means, whereby said first and said second sealing lips cooperate with said recess surface and said resilient circular diaphragm means to seal said first passage means from said valve housing receiving surface and said valve body receiving surface; and

inner washer means having an upper and a lower surface disposed in said recess radially inboard of said outer washer means, said lower surface facing said recess surface and having embossment means protruding from said lower surface against said recess surface to space said recess surface axially from said lower surface and to thereby allow said first passage means to communicate with said recess, said inner and outer washer means cooperating with said annular seating surface to normally support substantially the entire said sealing side of said resilient circular diaphragm means at a washer height above said recess substantially the same as said hub height.

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## 4,516,602
## DISC VALVE

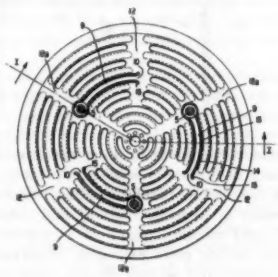
**Karl Lüdenbach, Engelskirchen, and Erhard Huhn, Overath, both of Fed. Rep. of Germany, assignors to Dienes Werke für Maschinenteile GmbH & Co. KG, Overath, Fed. Rep. of Germany**

**Filed Nov. 1, 1983, Ser. No. 547,567**

**Claims priority, application Fed. Rep. of Germany, Nov. 6, 1982, 3241050; Mar. 1, 1983, 3307118**

**Int. Cl.³ F16K *15/14***

**U.S. Cl. 137—512.15** **5 Claims**



1. A disc-valve of the type having a circular valve-plate disposed between a seat-plate and a catch-plate in which the valve-plate comprises a plurality of radial webs which are connected by ring segments to form circular segment-shaped flow openings which correspond to ring segments and openings in the seat-plate, in the catch-plate, and in any spring-or damping-plates, the disc-valve distinguished by the fact that:

the valve plate is guided by a plurality of bow-shaped guides, each guide extending in a circumferential path from a first of said webs to a second of said webs, each guide shaped by a clearance from the valve-plate and having a fixed end and a free end, each fixed end flanked by a rounded extra clearance in the middle of its respective first web whereby each guide has clearance at least above one ring segment of the seat-plate; the free end of each guide forming a clamping ring which surrounds a mounting bolt and is held in position by a plurality of excursion spacers, said mounting bolt passing through the respective second web associated with the guide,

the guide so configured that the edges of the surrounding clearance are positioned above and between the edges of the adjacent ring segment of the seat-plate.

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## 4,516,603
## CONTROL ARMATURE INSERTED IN THE FLOW ROUTE OF A SYSTEM FOR TRANSFERRING PRESSURE MEDIA IN A GASEOUS AND/OR LIQUID GASEOUS STATE

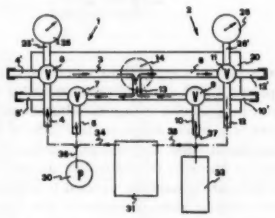
**Bruno A. Mock, Wylstr. 15, 6052 Hergiswil, Switzerland**

**Filed Jun. 29, 1983, Ser. No. 509,257**

**Claims priority, application Switzerland, Aug. 16, 1982, 4888/82**

**Int. Cl.³ F16K *37/00, 1/00***

**U.S. Cl. 137—559** **5 Claims**



1. A control valve assembly comprising:

a casing of generally prismatic shape having a front face;

a low-pressure fitting extending into said casing at a low-pressure side thereof and connectable to a suction pump;

a high-pressure fitting extending into said casing at a high-pressure side thereof and connectable to a source of pressure medium;

respective fittings connectable to a unit to be charged with said medium on said high-pressure and low-pressure sides of said casing;

first respective valves in said casing connected to each of said charging fittings;

a first conduit between the first valves connected to said fittings;

a second conduit between respective second valves connected to charging said high-pressure and low-pressure fittings;

a common connection between the first and second conduits forming respective T-junctions therewith; and

a sight glass in said face of said casing exposing to view at least the T-junction of said common connection with said first conduit, said common connection forming with said first-conduit a junction which curves at the latter T-junction.

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## 4,516,604
## PILOT OPERATED SUPPLY AND WASTE CONTROL VALVE

**John F. Taplin, 15 Sewall St., West Newton, Mass. 02165**

**Filed Apr. 20, 1984, Ser. No. 602,438**

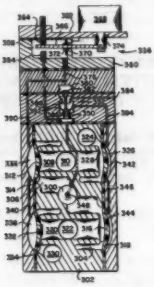
**Int. Cl.³ F15B *13/043***

**U.S. Cl. 137—596.15** **15 Claims**

14. A pilot operated fluid supply and waste valve of the type comprising two main diaphragm valves communicating with a

load port for alternately supplying and exhausting supply fluid to and from said load port, the supply fluid having a supply pressure, and control means for controlling fluid pressure on the control faces of main valving diaphragms incorporated in said main diaphragm valves to open and close a supply diaphragm valve communicating with said load port while conversely closing and opening a waste diaphragm valve communicating with said load port, the control means comprising:

a pilot valve providing an output pilot control pressure having a value derived from and about equal to the supply



pressure of said supply fluid when the pilot valve is in a first position and a lower pressure value when the pilot valve is in a second position, wherein said pilot control pressure is applied on the control face of one of the main valving diaphragms and said pilot control pressure is also applied to one side of a pressure driven element having lower pressure constantly applied to a second side of said pressure driven element opposite the first side, wherein said pressure driven element actuates a supply and waste type pressure reversing valve to apply reversed pressure to the control face of the other main valving diaphragm.

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**4,516,605**

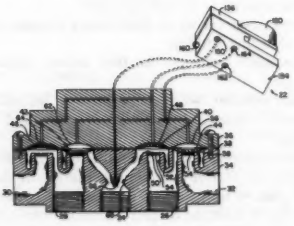
**FOUR-WAY CONTROL VALVE**

**John F. Taplin, 15 Sewall St., West Newton, Mass. 02165**

**Filed Apr. 20, 1984, Ser. No. 602,654**

**Int. Cl.³ F15B *13/043***

**U.S. Cl. 137—596.15** **8 Claims**



1. A pilot operated supply and waste control valve of the type comprising two main valves associated with at least one load port for alternately supplying and exhausting a supply fluid to and from each load port and control means for applying fluid control pressure to open and close a main supply valve associated with each load port while conversely closing and opening a main waste valve associated with each load port, wherein:

each main valve comprises a diaphragm which presses against a valve seat with a high pressure applied to a control surface of the diaphragm opposite to the valve seat; and

the control means is a four way pilot valve comprising:

first and second output pressure chambers, each having a high pressure inlet port in communication with a source of said supply fluid, a low pressure inlet port and an output control conduit for applying opposite high and low pressures to the control surfaces of the diaphragms of said main supply and waste valves associated with each load port;

a valve member associated with each output pressure chamber, each valve member comprising an arm having a first end thereof positioned between the high and low pressure inlet ports, a second end, and a fluid sealed pivot between the first and second ends, the arm being pivoted about the pivot to move said first end alternately against the high and low pressure inlet ports to alternately close the ports; and

one actuator for simultaneously driving the second ends of the pivotal arms of the respective valve members such that the high pressure port to one output pressure chamber is closed by one valve member arm as the opposite, low pressure port to the other output pressure chamber is closed by the other valve member arm such that one of the main supply and waste valves of each load port is opened due to the resultant pressure in one of the chambers and the other of the main supply and waste valves of each load port is closed due to the resultant pressure in the other chamber.

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**4,516,606**

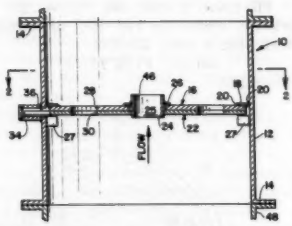
**VARIABLE ORIFICE VALVE ASSEMBLY**

**Arthur C. Worley, Mt. Tabor, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Feb. 16, 1983, Ser. No. 467,089**

**Int. Cl.³ F16K *3/08***

**U.S. Cl. 137—625.3** **10 Claims**

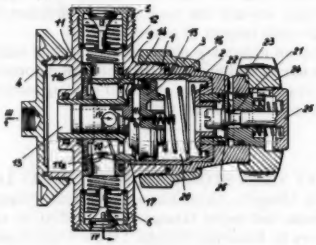


1. A disc valve for controlling the flow of a fluid solids mixture such as present in petroleum process equipment comprising a cylindrical tubular conduit, outwardly extending flange means at opposite ends of said tubular conduit for mounting said tubular conduit in a process conduit, a flat planar first orifice plate extending transversely across said tubular conduit and welded thereto, said first orifice plate including a circular central aperture and a plurality of spaced orifices disposed circumferentially about said central aperture, a flat planar second orifice plate having a plurality of orifices conforming in size and spacing to said orifices in said first orifice plate, said second orifice plate including a cylindrical tubular support means fixedly attached thereto and extending through said central aperture for suspending and pivotally mounting said second orifice plate from said first orifice plate, and means engaging a peripheral edge of said second orifice plate for rotationally adjusting the relative positions of the orifices in said first and second orifice plates.

## 4,516,607
## FAUCET MIXER

**Lucien Patient, Montrouge, France, assignor to Les Robinets Presto, Montrouge, France**

**Continuation of Ser. No. 960,551, Nov. 14, 1978, abandoned. This application Oct. 22, 1980, Ser. No. 199,668**
**Claims priority, application France, Nov. 23, 1977, 77 35147**
**Int. Cl.³ F16K** *11/10*
**U.S. Cl. 137—637.4** **1 Claim**



1. A faucet comprising a body comprising:

(a) a first body part adapted to be releasably attached to a second body part, wherein said first body part comprises:

(i) means for mounting said first body part on a mounting base on a wall at one end thereof;

(ii) two feed openings comprising means for receiving hot and cold water pipes, respectively, on opposite sides of said first body part;

(iii) an outlet for water from said hot and cold water pipes;

(iv) a cylindrical bore positioned between said feed openings at an anterior end of said first body part, comprising means for receiving water from said hot and cold water pipes;

(v) a cylindrical cock shell having an oblique opening therein and adapted to rotate in said bore, wherein said cock shell comprises means for producing any desired mix of hot and cold water in said cylindrical bore;

(vi) a first cylinder, attached to said cock shell, one end of which communicates with said two feed openings, the other end of which communicates with said outlet;

(vii) a valve, adapted to reciprocate in said cock shell cylinder, into an open and a closed position, wherein in said open position said valve permits fluid to flow from said two feed openings into said first cylinder and to said outlet, and in said closed position said valve blocks fluid flow from said two feed openings to said first cylinder;

(viii) a second cylinder, an anterior end of which is positioned in and adapted to rotate in said first body part of said body, and a posterior end of which is positioned in and adapted to rotate in said second body part of said body, wherein said second cylinder, at said anterior end thereof comprises means for attachment to one end of said cock shell so that rotation of said second cylinder rotates said cock shell, wherein said second cylinder, at the posterior and the anterior end thereof comprises an opening, and wherein said second cylinder further comprises a piston and having an opening in the center thereof, communicating with said second cylinder and said cock shell, and a spring adapted to bias a posterior end of said piston toward said cock shell, wherein said piston is attached at its anterior end to said valve; and wherein said body further comprises:

(b) a second body part, comprising:

(i) an auxiliary valve stem, attached to the posterior end of said second body part and adapted to rotate therein, wherein said valve stem is attached to the posterior end of said second cylinder such that rotation of said valve stem rotates said second cylinder;

(ii) a knob, attached to said valve stem and attached to said posterior end of said second body part, wherein said knob is adapted to rotate on said second body part, thereby rotating said valve stem;

(iii) a push button, adapted to reciprocate in said knob;

(iv) an auxiliary valve having a shaft at a posterior end thereof, attached to said push button, wherein said auxiliary valve is seated in said auxiliary valve stem and is adapted to reciprocate into a closed position in which said opening in the posterior end of said second cylinder is blocked, and is adapted to reciprocate into an open position in which said opening in the posterior end of said second cylinder is unblocked to permit fluid to flow therethrough; and

(v) elastic means attached to said shaft for biasing said auxiliary valve closed.

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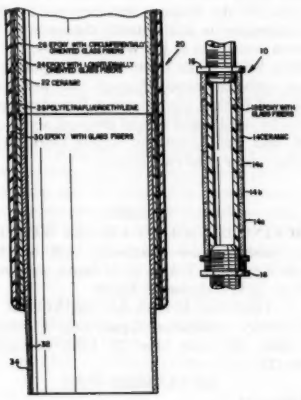
## 4,516,608
## TUBULAR MEMBER

**Charles H. Titus, Newtown Square, and John K. Wittle, Chester Springs, both of Pa., assignors to Electro-Petroleum, Inc., Wayne, Pa.**

**Filed Sep. 29, 1982, Ser. No. 427,712**
**Int. Cl.³ F16L** *9/14, 9/10, 11/18*
**U.S. Cl. 138—140** **19 Claims**




1. An elongated tubular member resistant to both tensile and compressive deformation and resistant to electrical stress comprised of a first annular layer of electrically non-conducting fiber reinforced organic resin material resistant to tensile deformation and a second annular layer of electrically non-conducting refractory material resistant to thermal degradation and compressive deformation.

2. An elongated tubular member resistant to both tensile and compressive deformation comprised of a first annular layer of fiber reinforced organic resin material resistant to tensile deformation and a second annular layer of refractory material resistant to thermal degradation and compressive deformation, said first and second layers being bonded together.

3. An elongated tubular member resistant to both tensile and compressive deformation comprised of a first annular layer of fiber reinforced organic resin material resistant to tensile deformation, a second annular layer of refractory material resistant to thermal degradation and compressive deformation; and collar means disposed at opposite ends of the first and second layers and in engagement with the first and second layers, said collar means simultaneously maintaining the first annular layer of fiber reinforced organic resin material in tension and the second annular layer of refractory material in compression.

**4,516,609**

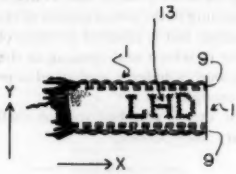
## CROSS STITCH RIBBON

**Linda H. Dennis, 519 E. Main St., Spartanburg, S.C. 29302**

**Continuation of Ser. No. 343,444, Jan. 28, 1982, abandoned. This application Mar. 14, 1984, Ser. No. 589,043**

**Int. Cl.³ D03D** *3/00, 25/00;* **D05C** *17/00*

**U.S. Cl. 139—383 R** **10 Claims**




1. A fabric for threaded embellishments, comprising:

a plain consistent weave fabric having no more than sixty (60) warp threads with a continuous filling thread, each of said warp threads forming with said continuous filling thread interstices of sufficient size to permit a needle to pass therethrough;

said fabric having a warp direction defined by said warp threads and a weft direction defined by said filling thread and wherein the distance between said interstices in the warp direction is substantially the same as the distance between interstices in the weft direction;

said fabric being of an open weave to permit needle and thread embellishments through the interstices of said fabric and further comprising a threaded embellishment woven by needle and thread through some of said interstices, said plain consistent weave fabric being substantially no wider than two inches.

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**4,516,610**

## WEFT PICKING DEVICE OF AIR JET WEAVING LOOM

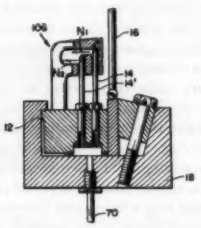
**Kimimasa Onishi; Takao Takahashi, both of Hachioji, and Masayuki Koriyama, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Aug. 1, 1983, Ser. No. 519,396**

**Claims priority, application Japan, Aug. 4, 1982, 57-135095; Mar. 29, 1983, 58-51463; Mar. 29, 1983, 58-51464; May 24, 1983, 58-91173**

**Int. Cl.³ D03D** *47/30*

**U.S. Cl. 139—435** **22 Claims**




1. A weft picking device of an air jet type weaving loom, comprising:

a plurality of air guide members which are aligned in the weft picking direction, each guide member having therein an air guide opening and a slit through which the weft thread passes out of the opening upon beating operation of the loom, said air guide opening having an inwardly projected land portion with first and second peripheral sides and including an air induction section directly connected to said slit and a weft guiding section connected through said air induction section to said slit, said first peripheral side of said land portion bounding partially said air induction section, while, said second peripheral side of said land portion bounding partially said weft guiding section; and

an auxiliary nozzle associated with one of the air guide members, said nozzle having an air jet opening facing said air induction section so that jet air from said opening advances toward said weft guiding section after passing through said air induction section, the opening being inclined toward the weft picking direction by a given angle with respect to said direction,

wherein an imaginary plane containing said second peripheral side of said inwardly projected land portion intersects the upper perimeter of said weft guiding section at a position spaced from said slit.

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**4,516,611**

## WEFT YARN STORAGE UNIT FOR JET LOOMS

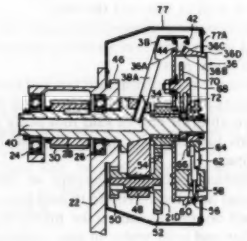
**Nobuharu Mimura, Aichi; Kazunori Yoshida, Nagoya; Susumu Kawabata, and Junzo Hasegawa, both of Aichi, all of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan**

**Filed Nov. 23, 1982, Ser. No. 444,062**

**Claims priority, application Japan, Nov. 25, 1981, 56-188667**

**Int. Cl.³ D03D** *47/36*

**U.S. Cl. 139—452** **21 Claims**




1. A weft yarn storage unit disposed between a yarn supply package and a weft insertion device for storing a weft yarn to be inserted in the warp shed, comprising

a differential yarn feeding device for feeding the weft yarn from said yarn supply package, and

a yarn storage means for winding the fed weft yarn thereabout by co-operating with said differential yarn feeding device, storing the wound weft yarn therearound and unwinding the stored weft yarn therefrom by co-operating with said weft insertion device,

said yarn storage means being continuously rotating in a direction opposite to the direction in which the weft yarn is unwound at a predetermined circumferential speed in response to an insertion speed of the weft yarn

whereby the circumferential speed of the unwound point of the stored weft yarn unwound from said yarn storage means is reduced, so that the centrifugal force applied to the weft yarn and the ballooning are reduced, and the back tension of the weft yarn is reduced to a sufficient degree.

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**4,516,612**

## MULTIPURPOSE TABLE SAW

**Edward R. Wiley, 9050 - 51st Pl., Mercer Island, Wash. 98040**

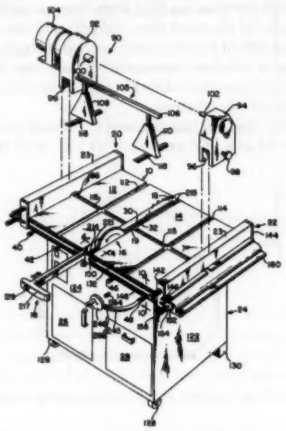
**Filed Sep. 3, 1982, Ser. No. 414,907**

**Int. Cl.³ B23D** *19/00;* **B27B** *31/00;* **B25H** *1/00;* **B27C** *9/00*

**U.S. Cl. 144—1 R** **30 Claims**

1. A woodworking system for performing multiple woodworking functions, comprising: a base; a saw assembly including a rotary saw blade supported by said base to provide a

woodcutting function; a table top supported by said base, said table top including at least one section that is movable to and from an operative position in which one edge thereof fronts upon one side of said rotary saw blade; and a conversion assembly positionable in a space formed between said rotary saw blade and said one edge when said one section is moved from its operative position, and comprising;



(a) a panel supportable by said base in said space, and securable to said base,

(b) drive means supported by said panel, and

(c) means operatively connected with said drive means providing another woodworking function, whereby a work piece may be subjected to another woodworking function.

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**4,516,613**

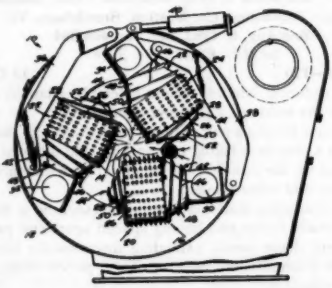
**DEBARKING MACHINE WITH INFEED ROLLS HAVING HELICAL OFFSET LOG FEEDER BLADES**

**Walden M. Gaitten, deceased, late of Sylacauga, Ala. (by Dorothy A. Gaitten, executrix), assignor to Kockums Cancar, Corp., Talladega, Ala.**

**Filed Dec. 9, 1983, Ser. No. 559,816**

**Int. Cl.³ B27L *1/00***

**U.S. Cl. 144—208 E** **7 Claims**



1. In a debarking machine of the type including an annular frame, a plurality of debarking tools, means mounting said tools in annularly spaced relation within said annular frame for rotation together about the axis of said annular frame and for movement toward and away from each other, infeed and outfeed mechanisms for feeding logs through said annular frame so that said tools will engage the exterior periphery of the successive logs and strip the bark therefrom during their movement through the annular frame, said infeed mechanism including three driven infeed spiked rolls arranged so that their spiked peripheries normally engage the exterior periphery of the log in centered relation and move the same axially through said annular frame for debarking by said tools, the improvement which comprises:

said infeed mechanism including helical blade means at the ends of each roll for rotation therewith configured with respect to the direction of rotational movement of the associated roll to move a log engaged thereby in a lateral direction toward the spiked periphery of the roll.

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**4,516,614**

**METHOD OF SLICING VENEER**

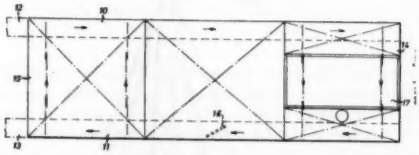
**Carl G. Grimhall, Djursholm, and Olav Hoel, Knislinge, both of Sweden, assignors to Tarkett AB, Tonneby, Sweden**

**Filed Jun. 3, 1983, Ser. No. 500,887**

**Claims priority, application Sweden, Nov. 3, 1982, 8206810**

**Int. Cl.³ B27L *5/06***

**U.S. Cl. 144—364** **7 Claims**



1. A method of slicing veneer by moving logs and at least one veneer knife relatively to one another in the longitudinal or transverse direction of the logs, wherein the log surface portion to be sliced is heated with dry heat for no more than about 27 seconds and to a temperature of about 80° C., immediately before slicing, said heating being controlled to a depth insignificantly greater than the thickness of the veneer to be sliced.

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**4,516,615**

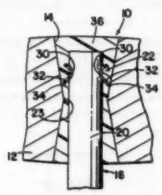
**TOOL HANDLE ATTACHMENT**

**Arnold H. Finn, Farmington, Conn., assignor to Taco Products, Incorporated, Plainville, Conn.**

**Filed Mar. 1, 1982, Ser. No. 353,357**

**Int. Cl.³ B25C *1/00***

**U.S. Cl. 81—20** **12 Claims**



1. In a tool having a head including an eye, an elongated handle having a grip portion and a connecting portion longitudinally spaced from the grip portion and disposed within the eye, and retaining means for securing the connecting portion to the head, the improvement wherein said retaining means comprises a generally U-shaped metal retaining clip disposed within said eye between said connecting portion and said head and having transversely extending legs straddling said connecting portion, at least one of said legs having a transversely extending first portion engaged with said connecting portion and a transversely extending second portion integrally joined

to said first portion and inclined in a longitudinal direction laterally outwardly and away from the surface of connecting portion and toward said grip portion, said second portion cooperating with an associated portion of said surface to define a generally wedge shaped space therebetween, said second portion terminating at an outer end laterally spaced from the surface of said connecting portion and engaging said head within said eye, said retaining clip coacting in wedging relation with said connecting portion and said head to increase resistance to separation between said handle and said head in response to pull-off force tending to effect said separation.

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**4,516,616**

## PORTABLE TOWEL ACCESSORY

**Ethel L. Fesler, 15129 SE. 141st Pl., Renton, Wash. 98056**

**Continuation of Ser. No. 365,534, Apr. 5, 1982, abandoned. This application Jan. 25, 1984, Ser. No. 573,595**

**Int. Cl.**[3] **A47K** *10/12*; **A63B** *57/00, 47/04*

**U.S. Cl. 150—52 R** **12 Claims**

1. In combination:

a fabric hand towel having a central portion;

a towel cover constructed from a sheet of a material which is at least water-resistant, said towel cover being a separate member from said towel and having a central portion;

connector means detachably connecting together the central portions of the towel and towel cover; and

carrying means connected so that, in use, the towel and towel cover are suspended from the carrying means and said towel and cover each hang freely from said means and each assume the shape of a pleated cone, with the central portions of the towel and cover forming apexes of the cones, whereby the combination may be carried with the towel cover over the towel, and access to the towel may be simply had by a user bringing his or her hands upwardly to the towel, and

wherein the connector means permits movement of the towel and towel cover between a first position in which the towel cover is draped over the towel and a second position in which the towel is draped over the towel cover, and wherein in each position the carrying means presents an upwardly directed handle portion and in each position the towel cover and towel hang freely from said carrying means.

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**4,516,617**

## METHOD OF MOUNTING A TIRE

**Hans Seitz; Udo Frerichs, both of Langenhagen; Heinz-Dieter Rach, Garbsen, and Siegmund Spendel, Betheln, all of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany**

**Filed Sep. 9, 1983, Ser. No. 530,864**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1982, 3233441**

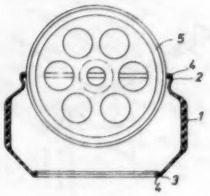
**Int. Cl.**[3] **B60C** *25/00*

**U.S. Cl. 157—1** **6 Claims**

1. A method of mounting a tire on a rim, for both the situation where in the vulcanizing state the axial distance between the bead regions of the tire is considerably greater than the width of the tread, and the bead regions could even be capable of being shifted relative to the bead cores, and the situation where in the vulcanizing state the axial distance between the bead regions is at most approximately the same as the width of the tread; the rim has two seats along its inner periphery, each of said seats being adjacent to a radially inwardly extending rim flange and to a circumferential recessed portion, the diameters of the bases of which are greater than the diameters of said rim seats; said tire also has two seats, one on each bead region in the vicinity of the bead core thereof; said tire and said rim each have an axis of rotation; said method includes the steps of:

providing a relative movement of said rim and said tire toward one another while keeping their axes of rotation at an angle to one another;

introducing said rim into the interior of said tire in the direction of the axis of rotation of said tire, with at least one of




said tire bead regions at this point having assumed an oval shape;

rotating said rim in such a way that the axes of rotation of said rim and said tire are at least parallel to one another, and the rim is in the interior of said tire;

with the seat of a given tire bead region, when viewed in cross section, approximately parallel to an adjacent seat of said rim, introducing a portion of said given bead region into the adjacent recessed portion of said rim;

introducing the remainder of said given bead region, over its entire periphery, into said adjacent recessed portion of said rim;

repeating said last two introducing steps for the other tire bead region; and

inflating said tire with air to bring said seats of said bead regions onto said seats of said rim.

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**4,516,618**

## EDGE SEAL AND RERAILER FOR INSULATING SHADE

**Bruce C. Gardner, Brattleboro; Daniel L. Ingold, Wardsboro, both of Vt., and David A. May, Brookline, Mass., assignors to Appropriate Technology Corporation, Brattleboro, Vt.**

**Filed Aug. 6, 1982, Ser. No. 406,064**

**Int. Cl.**[3] **E06B** *1/34, 3/28*

**U.S. Cl. 160—120** **13 Claims**

11. An insulating window shade assembly adapted to be mounted on the inside of a window comprising

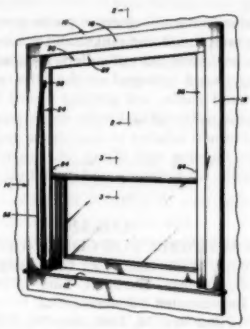
a shade frame having a pair of opposed vertical side channels open in a direction facing one another and adapted to be mounted on the inside of the window, each channel having inner and outer flanges,

a flexible insulating shade having its ends secured at the top of the shade frame and having spaced apart and parallel insulating shade panels extending downwardly between the side channels, the bottom of the panels being connected together,

means disposed at the bottoms of the panels weighing down the bottom of the shade to cause the panels to lie in vertical planes,

and two pair of generally parallel inner and outer, spring-like vertically extending, elongated sheets, one pair of said sheets lying within each of the channels, each pair of sheets having a generally U-shape to conform to the shape of said channel, and having outer edges facing said panels to form U-shaped edge seals, the edges of the two sheets of

each pair being disposed within the channels adjacent the channel flanges, the adjacent sides of the edges of each pair of the sheets being biased against one another and



defining slits within the channels just inside the flanges, the vertical side edges of the panel extending into the slits to be captured between the two edges of the two sheets to form surface to surface edge seals with the sheets.

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**4,516,619**

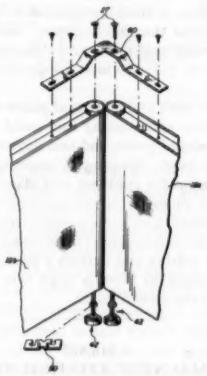
## PARTITION SYSTEM AND CONNECTORS THEREFOR

**Gene B. Hasbrouck, deceased, Late of Corry, Pa. (by Anna B. Hasbrouck, legal representative), assignor to Hon Industries, Inc., Muscatine, Iowa**

**Filed Aug. 16, 1982, Ser. No. 408,447**

**Int. Cl.³ A47G *5/00***

**U.S. Cl. 160—135** **9 Claims**



**1.** A partition system comprising first and second partition panel components arranged in edge-to-edge abutting relation with one another, a glide stem disposed at the bottom of each panel component adjacent the respecttive abutment edge, a connector for spanning the joint between said first and second panel components and detachably retaining said first and second panels in abutting relationship with one another, said connector having spaced open-sided latch portions for engaging said glide stem on each of said panel components whereby said panel components are urged by said connector into such abutting relation.

**4,516,620**

## PRIVACY SCREEN MODULE

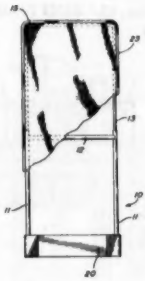
**Louise J. Mulhern, 800 Lakeshore Rd., Apt. 59, Dorval, Quebec, Canada**

**Filed Mar. 9, 1983, Ser. No. 473,669**

**Claims priority, application Canada, Oct. 21, 1982, 413938**

**Int. Cl.³ A47G *5/00***

**U.S. Cl. 160—351** **16 Claims**



**1.** A privacy screen module comprising a self supporting open topped stand having hexagonal shape with parallel sides and a pair of end faces at each end, said stand adapted for being filled through said open top with particulate material for thereby providing stability for said stand, the pair of end faces having an included angle not greater than about 90°, said frame having a nontransparent screen surface, the frame having upright members extending from the included angles of the stand, t upright members positioned such that a second screen module can be placed at an angle of up to about 90° on either side from an in-line position adjacent the first screen module, and the upright members of the first and second screen modules retain the same minimum distance apart.

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**4,516,621**

## MOULD ASSEMBLY FOR CASTING METAL ARTICLES

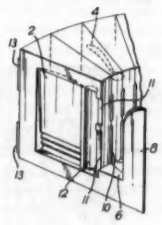
**David Mills; Alan D. Kington, and Rodney J. Close, all of Bristol, England, assignors to Rolls-Royce Limited**

**Filed Apr. 2, 1982, Ser. No. 365,047**

**Claims priority, application United Kingdom, Apr. 13, 1981, 8111519**

**Int. Cl.³ B22C *9/08, 9/20***

**U.S. Cl. 164—339** **5 Claims**



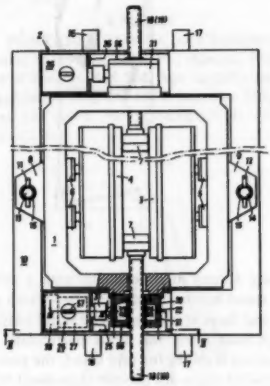
**1.** A mould assembly for producing multiple castings comprising a plurality of moulds each defining a mould cavity. means for holding the moulds together in an assembly, a runner passage communicating with all of the mould cavities through at least one slit formed in each mould, and in which the width of each slit lies in the range from 1.25 mm to 0.25 mm.

**4,516,622**

## PLATE MOULD OF A CONTINUOUS CASTING PLANT

**Heinrich Thöne, Stiedelsbach; Reinhard Hargassner, Linz; Gottfried Deibl, Luftenberg, and Günter Holleis, Linz, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Aug. 2, 1982, Ser. No. 404,502**
**Claims priority, application Austria, Aug. 21, 1981, 3658/81; May 25, 1982, 2052/82**
**Int. Cl.³ B22D *11/04, 11/00***
**U.S. Cl. 164—416** **16 Claims**



2. In a plate mould of a continuous casting plant, in particular for continuously casting steel slabs, of the type including a reciprocating mould lifting table, a carrying frame mounted on said lifting table, a stationary supporting structure neighboring said lifting table, mould walls supported on said carrying frame and defining a mould cavity, and an adjustment means for displacing at least one of said mould walls transversely to the mould axis for changing the strand cross sectional format, the improvement wherein said adjustment means includes an adjustment drive mounted on said lifting table, and a coupling means for releasably connecting said adjustment drive with said at least one displaceable mould wall.

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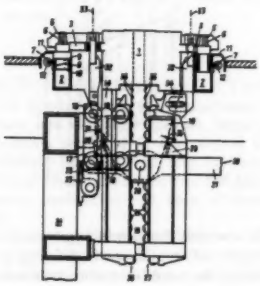
**4,516,623**

## CONTINUOUS CASTING PLANT

**Alois Scheinecker, Linz, Austria, assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria**

**Filed Sep. 17, 1982, Ser. No. 419,282**
**Claims priority, application Austria, Sep. 17, 1981, 4018/81**
**Int. Cl.³ B22D *11/04***
**U.S. Cl. 164—416** **4 Claims**



1. In a continuous casting plant including

a mould,

a reciprocating lifting table accommodating said mould, and

a strand guide section following upon said mould, in particular designed as a bending means, the improvement comprising

at least one vertically oriented guiding sword arranged on one of said mould and said strand guide section and roller means, including pairs of rollers, for cooperating with said guiding sword arranged on the other of said mould and said strand guide, said guiding sword being inserted between the rollers of said roller means to adjust the position of said mould relative to said strand guide section, and

means for aligning said lifting table relative to said mould and means for fastening said mould on said lifting table.

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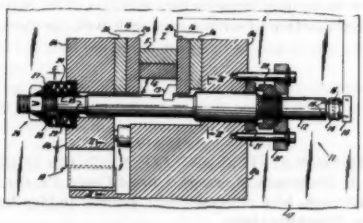
**4,516,624**

## MOLD ASSEMBLY FOR CONTINUOUS CASTING

**Michael Poran, Westwood, N.J.; Carl Langner, Monsey, and Chester C. Tobiasz, Elmhurst, both of N.Y., assignors to Concast Incorporated, Montvale, N.J.**

**Filed Dec. 24, 1981, Ser. No. 334,342**
**Int. Cl.³ B22D *11/00, 11/04***
**U.S. Cl. 164—418** **13 Claims**



1. A mold assembly for a continuous casting apparatus having a guide for a continuously cast strand which issues from said mold assembly, a mold support table for supporting said mold assembly, and the mold support table being provided with a fixed element said mold assembly comprising:

(a) a plurality of plates which cooperate to define a mold cavity; and

(b) a device for both clamping said plates in position relative to one another and aligning said mold cavity with reference to the strand guide, and said device comprising a rod arranged to exert clamping pressure on said plates, and clamping means for applying said clamping pressure, said rod having a tongue which contacts one of said plates, and said rod having a reference end which abuts the fixed element to the mold support table when said assembly is in position for casting and defines a predetermined distance with said tongue to thereby align said mold cavity with reference to the strand guide.

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**4,516,625**

## ELECTROMAGNETIC CONTROL SYSTEM FOR CASTING THIN STRIP

**John C. Yarwood, Madison, and Derek E. Tyler, Cheshire, both of Conn., assignors to Olin Corporation, New Haven, Conn.**

**Filed Jan. 10, 1983, Ser. No. 456,687**
**Int. Cl.³ B22D *11/16***
**U.S. Cl. 164—454** **25 Claims**

1. In an apparatus for forming material such as feed ribbon or rod material into a desired thin strip shape, said material including during said forming an upstream and a downstream liquid-solid interface, defining molten material head and solid material portions of said material;

means for electromagnetically containing and forming said material in molten form into said desired thin strip shape,

said electromagnetic containing and forming means comprising: inductor means having at least upstream and downstream sections respectively arranged to be adjacent said upstream and downstream liquid-solid interfaces for applying a magnetic field to said molten material;

means for applying an alternating current to said inductor means to generate said magnetic field, said magnetic field defining a containment zone for said molten material and a gap between said molten material and said inductor means;

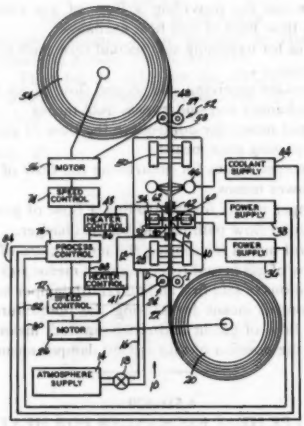
means for delivering said feed material to said containment zone at a delivery rate;

means for withdrawing said desired thin strip from said containment zone at a withdrawal rate;

means for monitoring the location of said upstream and downstream liquid-solid interfaces; and

control means responsive to the monitoring means for controlling the location of said upstream and downstream liquid-solid interfaces so as to reduce variations in the grain structure of the desired thin strip.

16. A process for forming material such as feed ribbon or rod material into a desired thin strip shape, said material including




during said forming an upstream and a downstream liquid-solid interface defining molten material head and solid material portions of said material, said process comprising the steps of:

electromagnetically containing and forming said material in molten form into said desired thin strip shape;

providing at least one inductor having upstream and downstream sections respectively arranged to be adjacent said upstream and downstream liquid-solid interfaces for applying a magnetic field to said molten material head;

applying an alternating current to said upstream and said downstream sections of said at least one inductor to generate said magnetic field, wherein said magnetic field defines a containment zone for said molten material and a gap between said molten material and said inductor;

delivering said feed material to said containment zone at a delivery rate;

withdrawing said desired thin strip from said containment zone at a withdrawal rate;

monitoring the location of said upstream and downstream liquid-solid interfaces; and

controlling the location of said upstream and downstream liquid-solid interfaces so as to reduce variations in the grain structure of the desired thin strip.

**4,516,626**

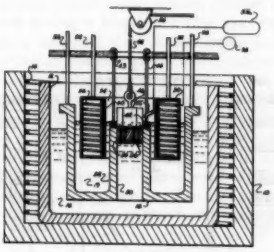
## APPARATUS AND METHOD FOR PRODUCING ARTICLE SHAPES FROM A COMPOSITE MATERIAL

**Moysey Liberman, 32 Cross Pointe, Greenville, S.C. 29607**

**Filed Sep. 17, 1982, Ser. No. 419,145**

**Int. Cl.³ B22D *19/14***

**U.S. Cl. 164—461** **16 Claims**



1. Apparatus for producing shaped composite articles from a matrix material and a reinforcing material to reduce the interaction of the materials in producing said articles, said apparatus comprising:

a matrix crucible for containing said matrix material;

furnace means for heating said matrix material to a desired temperature;

capillary means carried by said matrix crucible having an interior side exposed to fluid communication with said matrix material and an exterior side out of contact with said matrix materials; said capillary means including a number of capillary openings for the passage of said reinforcing material;

shape forming means carried adjacent said capillary means:

means for providing a liquid contact zone in which said reinforcing material first contacts said matrix material to form a composite material, said liquid contact zone being defined by a predetermined level of said matrix material between said capillary means and said shape forming means;

liquid level control means for controlling and maintaining said predetermined level of said matrix material in said matrix crucible above the level of said capillary means so that little or no chemical interaction between said reinforcing material and matrix material takes place during the time and space of said contact zone;

means for passing said reinforcing material serially through said capillary openings of said capillary means and said contact zone to form said composite material;

said capillary means preventing physical contact of said matrix material and reinforcing material except above said capillary means in said liquid contact zone;

means for passing said composite material through said shape forming means;

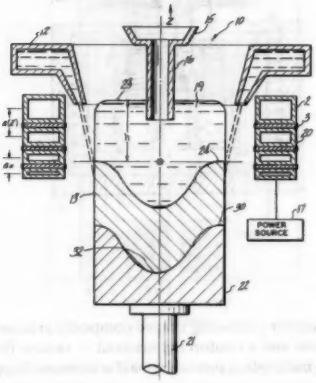
said shape forming means forming said composite material into a desired shape corresponding to said shape forming means; and

means solidifying said composite material passing through said shape forming means producing a solid composite article of a predetermined shape and having predetermined physical and mechanical properties.

## 4,516,627
## MULTI-TURN COILS OF CONTROLLED PITCH FOR ELECTROMAGNETIC CASTING

Gerhart K. Gaule, Elberon, N.J.; John C. Yarwood, Madison, and Derek E. Tyler, Cheshire, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 185,114, Sep. 8, 1980, abandoned, which is a division of Ser. No. 9,429, Feb. 5, 1979, abandoned. This application Jun. 25, 1982, Ser. No. 392,049
Int. Cl.³ B22D 27/02
U.S. Cl. 164—467 5 Claims




1. A process for electromagnetic forming of molten material into a casting of desired shape comprising:

establishing a casting zone defining an upstream portion and a downstream portion;

placing a variable-pitch multi-turn inductor in surrounding relation to said zone, said inductor comprising at least three individual turns arranged in a stacked relationship with each turn being oriented parallel to each other such that the center line through the midpoint of each turn is substantially perpendicular to the longitudinal axis through the inductor in the direction of casting, said individual turns being electrically connected in series;

setting the pitch between turns of said inductor substantially in accordance with the formula

$$a_{(z)} = a_o\sqrt{\frac{h-z}{h}}$$

wherein

$a_{(z)}$ = the pitch or spacing between inductor turns at a height z above the solidification interface

$a_o$ = the pitch or spacing between inductor turns at the solidification interface

h = the total molten material head

z = the height above the solidification interface;

passing a current through said inductor to generate an electromagnetic field in said casting zone, said field being characterized by a substantially uniform flux density in a transverse direction and a gradually diminishing flux density in a longitudinal direction toward the upstream portion of said casting zone; and

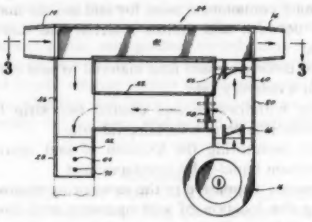
pouring said molten material into said casting zone;

whereby said molten material is formed into a casting of desired shape having substantially vertical sidewalls.

## 4,516,628
## HEAT RECOVERY SYSTEM AND METHOD

William F. Ward, 5947 Winding Way, Sylvania, Ohio 43560

Filed Sep. 30, 1982, Ser. No. 429,967
Int. Cl.³ G05D 23/00
U.S. Cl. 165—36 12 Claims



1. An energy recovery apparatus comprising, in combination, heat exchanger means having a first flow path and an independent second flow path in thermal communication with said first flow path,

blower means for providing a flow of gas through said second flow path of said heat exchanger,

duct means for bypassing said second flow path of said heat exchanger,

duct means for receiving said second flow of gas from said heat exchanger and said bypass duct means,

first damper means for controlling the flow of gas through said bypassing duct means,

second damper means for controlling the flow of gas from said blower means,

third damper means for controlling a flow of gas through said second flow path of said heat exchanger,

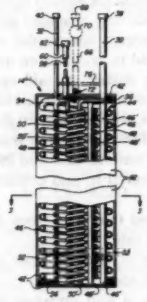
first control means for sensing the temperature of said second flow of gas in said receiving duct means and adjusting the positions of said first and said third damper means, and

second control means for sensing the temprature of said second flow of gas in said receiving duct means and adjusting the position of said second damper means.

## 4,516,629
## EARTH-TYPE HEAT EXCHANGER FOR HEAT PUMP SYSTEM

Grady A. Bingham, Morehead City, N.C., assignor to Thermal Concepts, Inc., Morehead City, N.C.

Continuation-in-part of Ser. No. 365,992, Apr. 6, 1982, abandoned. This application Sep. 22, 1982, Ser. No. 421,143
Int. Cl.³ F24J 3/02; F28F 13/14
U.S. Cl. 165—45 3 Claims



1. An earth-type heat exchanger unit for a heat pump heating

and/or cooling system containing freon type fluid and having above-ground system components, comprising:

a coil assembly formed of heat conductive and corrosion resistant tubing, said coil assembly being located during operation of said system below ground level;

conduit means communicating with and extending from said coil assembly for, during use of said system, conducting said fluid between said coil assembly and said system below ground level;

said coil assembly including means for directing separate portions of said fluid conducted thereto during operation of said system along separate flow paths, said means for directing including a plurality of coils each defining part of respective ones of said flow paths, said coil assembly being of generally cylindrical shape having a central axis, each of said coils being of generally cylindrical shape, each of said coils comprising a plurality of adjacent convolutions, said coils extending in radially spaced and substantially concentric relationship relative to each other about the central axis of said assembly, said adjacent convolutions of each of said coils spaced from each other and said coils being formed of said tubing and in different ones of said coils said tubing being of different diameter.

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**4,516,630**

## MOTORCYCLE RADIATOR

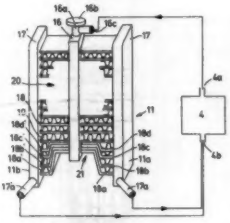
**Ken Yamaguchi, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 26, 1983, Ser. No. 517,299**

**Claims priority, application Japan, Jul. 27, 1982, 57-113589[U]; Aug. 11, 1982, 57-121868[U]**

**Int. Cl.³ F24H** *3/00*

**U.S. Cl. 165—47** **7 Claims**



1. Heat exchange device for mounting between the power unit and the front fork of a motorcycle, said device comprising an open space of generally inverted U shape in the bottom region of said device, said space being formed by a plurality of tubes bent so as to jointly form said generally inverted U shape, said bent tubes being located beneath a plurality of straight tubes and, together with said straight tubes, constituting the core of said device, whereby sufficient clearance is provided between the front fender of said motorcycle and said heat exchange device to accommodate the expansion and contraction strokes of said front fork.

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**4,516,631**

## NOZZLE COOLED BY HEAT PIPE MEANS

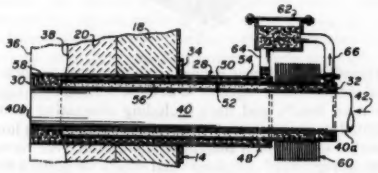
**Cornelius R. Russell, Goshen, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Continuation of Ser. No. 318,247, Nov. 4, 1981, abandoned. This application Dec. 23, 1983, Ser. No. 564,662**

**Int. Cl.³ F28D** *15/00*

**U.S. Cl. 165—47** **3 Claims**

1. In an apparatus embodying a combustion chamber, a nozzle assembly including a hollow member having one end thereof in fluid flow communication with the interior of the combustion chamber, the nozzle assembly being operative to effect the conveyance therethrough as well as the introduction therefrom into the combustion chamber of one of the substances that is required in order to support combustion within the combustion chamber, the improvement comprising heat pipe means operative to effect cooling of the hollow member, said heat pipe means including a member having an evaporator end and a condenser end, said member being mounted in concentric relation to the hollow member, said member including a first wall surface, a second wall surface and a divider wall surface, said first wall surface supported in abutting relation to the exterior of the hollow member, said first wall surface having a length less than the length of the hollow member, said second wall surface extending in parallel relation to said first wall surface and having a length less than the length of said first wall surface, said first wall surface being joined to said second wall surface at said evaporator end of said member, said divider wall surface being perforated for a portion of the length thereof and extending in parallel relation to both said first wall surface and said second wall surface, said divider wall surface having a length less than the length of said first wall surface, said divider wall surface being joined to said first wall suffface at said condenser end of said member and being joined to said second wall surface at a point intermediate the length of said divider wall surface, said divider wall surface being operative to divide said member into a first chamber located between said divider wall surface and said first wall surface and a second chamber located between said divider wall surface and said second wall surface, said heat pipe means further including wick-like material located within said second chamber and at said evaporator end of said member, said heat pipe means also including a reservoir, an inlet pipe and an outlet



pipe, said reservoir being located externally of said member, said inlet pipe having one end thereof connected in fluid flow relation to said reservoir and the other end thereof connected in fluid flow relation to said first chamber at said condenser end of said member, said outlet pipe having one end thereof connected in fluid flow relation to said reservoir and the other end thereof connected in fluid flow relation to said second chamber adjacent the point of joinder of said second wall surface to said divider wall surface, said heat pipe means further including heat-dissipating means including a multiplicity of fin-like members mounted on the exterior of said divider wall surface intermediate said inlet pipe and said outlet pipe, said multiplicity of fin-like members being mounted so as to extend outwardly in a radial direction from said divider wall surface, said heat pipe means containing a supply of coolant fluid and having a fluid flow path established therewithin for said coolant fluid, said wick-like material being operative to cause said coolant fluid to flow as a liquid by capillary action through said second chamber along said fluid flow path from said condenser end to said evaporator end of said member, at said evaporator end said coolant fluid absorbing heat from the combustion chamber so as to become vaporized, as vapor said coolant fluid flowing through said first chamber along said fluid flow path from said evaporator end to said condenser end of said member, at said condenser end said coolant fluid being cooled so as to condense, at said condenser end said coolant fluid flowing from said first chamber through said inlet pipe to said reservoir and through said reservoir to said outlet pipe and from said outlet pipe into said second chamber, said coolant fluid being continuously circulated through said second cham-

ber and said first chamber so as to thereby effect a cooling of the hollow member that is surrounded by said heat pipe means.

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**4,516,632**

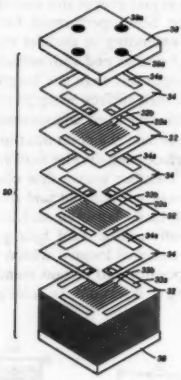
## MICROCHANNEL CROSSFLOW FLUID HEAT EXCHANGER AND METHOD FOR ITS FABRICATION

**Gregory W. Swift, Los Alamos; Albert Migliori, Santa Fe, and John C. Wheatley, Los Alamos, all of N. Mex., assignors to The United States of America as represented by the United States Deparment of Energy, Washington, D.C.**

**Filed Aug. 31, 1982, Ser. No. 413,635**

**Int. Cl.³ F28F** *3/00, 3/08*

**U.S. Cl. 165—167** **3 Claims**



**1.** A crossflow fluid heat exchanger comprising a stack of thin metal sheets brazed together so as to be bonded by integral metal-to-metal bonds, said stack including alternating slotted and unslotted sheets, each of said slotted sheets having a plurality of parallel slots formed therein which extend over rectangular central regions of said sheets and which form fluid flow channels when sandwiched between said unslotted sheets, successive slotted sheets in the stack being oriented with their slots extending substantially orthogonally so as to form two sets of fluid flow channels arranged in a crossflow configuration, each of said unslotted sheets including a set of four rectangular manifold openings positioned adjacent the peripheral edges of said unslotted sheet, and wherein each of said slotted sheets includes a set of four rectangular manifold openings adjacent the peripheral edges of said slotted sheet, the manifold openings in said unslotted sheets being wider than the manifold openings in said slotted sheets so as to overlap the ends of the slots in said slotted sheets, whereby said manifold openings of said unslotted sheets and said manifold openings of said slotted sheets are aligned to form internal fluid flow manifolds connecting the opposite ends of the two orthogonal sets of fluid flow channels.

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**4,516,633**

## BLIND SHAFT DRILLING

**Paul Richardson, Santa Ana; Daniel C. Albers, El Toro, and David A. Whitley, Brea, all of Calif., assignors to Santa Fe International Corporation, Alhambra, Calif.**

**Filed Sep. 18, 1981, Ser. No. 303,511**

**Int. Cl.³ E21D** *13/06;* **E21B** *17/18, 17/10*

**U.S. Cl. 166—69** **34 Claims**

**32.** Apparatus for drilling a blind shaft hole having a diameter in excess of 10 feet to a depth of over 2000 ft., said apparatus comprising:

(a) reverse circulation drilling means including a high torque drill bit and a plurality of non-rotating stabilizer rings attached at the end of a drill string, arranging the stabilizer rings on the drill string so as to allow the drill string to rotate within the stabilizer rings while the stabilizer rings do not rotate with respect to the walls of the hole being drilled and therefore such stabilizer rings being non-rotating stabilizer rings;

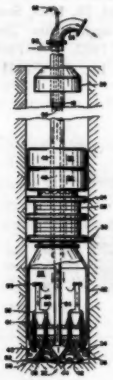
(b) weights in excess of approximately 300,000 pounds along said non-rotating stabilizer rings being arranged on said drill string near the bottom of said drill string within approximately 50 feet of said drill bit;

(c) said non-rotating stabilizer rings having an outer diameter substantially equal to the diameter of the hole being drilled and spaced longitudinally along said drill string for providing contact with the walls of the hole at different vertical positions for maintaining the alignment of the drilling bits;

(d) means for maintaining fluid in the drilled hole during the drilling operation at a sufficent level for creating a hydrostatic head for exerting an opposing pressure on any zone of instability on the walls of the drilled hole so as to prevent inflow of water and debris;

(e) liquid circulating means for circulating liquid through said drill string across the surface of said drill bit with sufficient turbulence so as to clean said drill bit;

(f) liquid extracting means for extracting liquid from the hole for removing broken materials from the drilled hole, extracting such liquid through an inner cylinder of the drill string with sufficient velocity so as to exceed the slip velocity;



(g) air supply means for forcing air down the drill string through an outer cylinder in the drill string, such air then helping to create sufficient force for extracting liquid with the broken material up through the inner cylinder in the drill string; and

(h) means for reinforcing weak permeable spots on the walls of the drilled hole by pumping a packing material into such spots when encountered during the drilling operation.

**34.** Apparatus for drilling a blind shaft hole having a diameter in excess of 10 feet, said apparatus comprising:

(a) reverse circulation drilling means including a high torque drill bit and a plurality of non-rotating stabilizer rings attached at the end of a drill string and arranged so as to allow the drill string to rotate with the stabilizer rings while the stabilizer rings do not rotate with respect to the walls of the holes being drilled;

(b) said non-rotating stabilizer rings having an outer diameter substantially equal to the diameter of the hole being drilled and spaced longitudinally along said drill string near the bottom of said drill string adjacent to the drill bit for providing contact with the walls of the hole at different vertical positions and for maintaining the alignment of the drilling bit;

(c) means for maintaining fluid in the drilling hole during the drilling operation at a sufficient level for creating a hydrostatic head for exerting an opposing pressure on any zone of instability on the walls of the drilling hole so as to prevent inflow of water and debris;

(d) liquid circulating means for circulating liquid through said drill string across the surface of said drill bit with sufficient turbulence so as to clean said drill bit;

(e) liquid extracting means for extracting liquid from the hole for removing broken materials from the drilled hole, extracting such liquid through an inner cylinder of the drill string with sufficient velocity so as to exceed the slip velocity; and

(f) air supply means for forcing air down the drill string through an outer cylinder in the drill string to create sufficient force for extracting liquid containing broken material up through the inner cylinder in the drill string.

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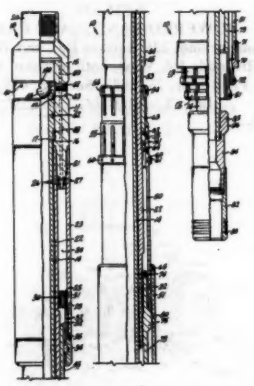
**4,516,634**

## HYDRAULIC RUNNING AND SETTING TOOL FOR WELL PACKER

**Glen E. Pitts, The Colony, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.**

**Filed Apr. 14, 1983, Ser. No. 485,017**
**Int. Cl.³ E21B *33/128***
**U.S. Cl. 166—120** **16 Claims**



1. A running and setting tool for a well packer having a body mandrel, a seal assembly, upper and lower slip assemblies, a setting sleeve for setting said upper slip assembly, and means on said body mandrel for setting said lower slip assembly, said tool comprising: a head assembly connectible with a supporting tubing string and including an annular cylinder and an annular piston; a tubular tool body secured at a first end into said head assembly; first releasable locking means on the second opposite end of said tool body for coupling said tool with said packer mandrel and applying weight forces on said packer mandrel to said tool; second locking means coupled with said annular piston for releasable locking with and operating said packer setting sleeve to set said upper slip assembly; and an operating tube releasably connected at a first end with said tool head assembly and having means along a second opposite end for operating said first locking means to release said tool from said packer mandrel after said packer is set in a well bore.

**4,516,635**

## METHOD OF EXTRACTING AND REUTILIZING SURFACTANTS FROM EMULSIONS WITH SULFONATED ALKYL BENZENES AND ALCOHOLS

**Jim Maddox, Jr., Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Dec. 7, 1983, Ser. No. 559,077**
**Int. Cl.³ E21B *43/22, 43/40***
**U.S. Cl. 166—266** **25 Claims**

1. A method for extracting and concentrating enhanced oil recovery surfactants into a relatively small volume surfactant-rich middle phase from produced emulsions comprising oil, water and surfactant, which comprises:

mixing a produced emulsion with an extracting compound solution of water containing about 0.3% to about 6.0% of a first extracting compound selected from the group consisting of the alkali metal salts and ammonium salts of propyl benzene sulfonate, cumene sulfonate, ethyl benzene sulfonate, methyl ethyl benzene sulfonate, diethyl benzene sulfonate, methyl propyl benzene sulfonate, xylene sulfonate and dicyclopentadiene sulfonate;

allowing the mixture of produced emulsion and first extracting compound solution to separate into at least three phases, including a substantially surfactant-free and water-free crude oil phase, a first relatively low volume middle phase containing surfactant, oil and water, and an oil-free aqueous phase;

mixing a second extracting compound with said first relatively low volume middle phase in the quantity of about 0.5% to about 3% volume per volume of first middle phase, said second extracting compound consisting of an alkanol having two to four carbon atoms; and

allowing the mixture of first low volume middle phase and alkanol to separate into at least three phases, including a substantially surfactant-free and water-free crude oil phase, a second relatively smaller volume surfactant-rich middle phase containing surfactant, oil and water, and an oil-free aqueous phase.

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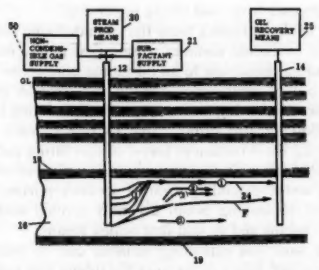
**4,516,636**

## ENHANCED STEAM DRIVE RECOVERY OF HEAVY OIL

**Todd M. Doscher, 740 A E. Main St., Ventura, Calif. 93001**

**Continuation-in-part of Ser. No. 342,465, Jan. 25, 1982. This application Dec. 22, 1982, Ser. No. 452,200**
**Int. Cl.³ E21B *43/24, 43/25***
**U.S. Cl. 166—272** **7 Claims**




1. A method of enhanced steam drive recovery of oil from an oil zone disposed below an overburden, said method comprising the steps of:

injecting a surface active agent continuously into a supply of driving steam to uniformly mix said surfactant with said steam injecting a non-condensible gas into said steam-surfactant mixture at a rate of at least 100,000 standard cubic feet per day but no more than 10,000,000 standard cubic feet per day per injection well to provide a driving fluid which includes steam surfactants and non-condensible gas, and

introducing said driving fluid into said oil zone under sufficient pressure to cause said fluid to drive through a flow channel between the interface of the oil zone and the overburden thereabove and spread said surfactant evenly therethrough said surfactant reacting with said oil to enable said fluid to strip away a top layer of said oil which is driven to a production well for removal thereof.

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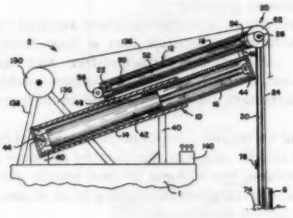
**4,516,637**

## HOISTING APPARATUS AND METHOD FOR RAISING OIL TUBING

**Elmer Winckler, Anchorage, Ak., assignor to James W. McManus, Bakersville, N.C. and James Backus, Cheyenne, Wyo.**

**Filed Aug. 8, 1983, Ser. No. 521,618**
**Int. Cl.³ E21B** *19/00*
**U.S. Cl. 166—377** **23 Claims**



**12**. A vehicle for raising an oil tubing string, comprising:

a support frame mounted on the vehicle;

a first telescoping boom assembly mounted on said support frame, including a first secured member and a first extending member oriented to extend in a first direction;

a second telescoping boom assembly mounted on said first boom assembly and secured to said first extending member for movement therewith, said second telescoping boom assembly having a lifting upper end and a lower end from which a second extending member is adapted to extend in a direction parallel to but opposite from said first direction;

first pulley means having means for receiving a lifting cable and for allowing a lifting cable to ride thereon and movably depend from said lifting upper end;

a lifting cable extending from the extended free end of said second extending member to said first pulley means and depending therefrom to an oil tubing connector;

second pulley means mounted on said second extending member and having means for receiving a lifting cable and for allowing said lifting cable to ride thereon and for changing the direction of travel of said lifting cable at the extended free end of said second extending member, said lifting cable extending from a secured portion of said second telescoping boom assembly around said second pulley means and to said first pulley means,

whereby said first extending member can be extended to position said lifting cable over the tubing and said second extending member can be extended to raise said lifting cable and connected tubing and the position of said second pulley means relative to said first pulley means is independent of the extension of said first telescoping boom assembly.

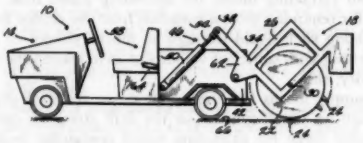
**18**. A vehicle as defined in claim **12**, further comprising clamping means for clamping onto and securing the hoisted object to said lifting upper end other than by said lifting cable in order to allow said lifting cable to be disconnected from the hoisted object, said clamping means depending from said lifting upper end and positioned beneath said first pulley means.

**4,516,638**

## SOIL AERATING APPARATUS WITH HYDRAULIC VALVE ARRANGEMENT

**John E. Hicks, and James J. Kubat, both of Lincoln, Nebr., assignors to Outboard Marine Corporation, Waukegan, Ill.**

**Filed May 25, 1983, Ser. No. 497,747**
**Int. Cl.³ A01B** *45/02;* **F16K** *31/28*
**U.S. Cl. 172—22** **10 Claims**



**1**. A hydraulic valve arrangement comprising valve means adapted to be operably connected to a hydraulic cylinder including a piston rod, said valve means including a valve member movable between a first position wherein the piston rod is extended or retracted, a neutral position wherein the piston rod is in a fixed position, and a float position wherein the piston rod can move freely, means for biasing said valve member towards said neutral position, means for moving said valve member between said valve member positions comprising a lever operably connected to said valve member, and manual release means associated with said lever for permitting said lever to be moved between said first and neutral positions but positively preventing said lever from being accidentally moved to the float position until released and for selectively permitting said lever to be moved to said float position.

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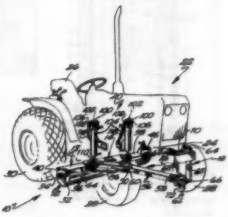
**4,516,639**

## POWERED LANDSCAPE RAKE

**Kenneth Hammarlund, 226 Ratikas Rd., and Wilford Hammarlund, 57 Riverside Rd. West, both of Esko, Minn. 55733**

**Filed Mar. 28, 1983, Ser. No. 479,606**
**Int. Cl.³ A01B** *33/02, 65/02*
**U.S. Cl. 172—99** **13 Claims**



**1**. Powered landscape rake for fine grading and for stone and debris removal from a landscape surface for mounting to a tractor having a frame, front wheels, and rear wheels comprising, in combination: a drum including a cylindrical member; axial extending elongated ribs formed on the cylindrical member for providing a kicking type action to be landscape surface when the cylinder member is rotated and engages the landscape surface; a drum frame including means for rotatably mounting the drum with respect to the drum frame; means for rotating the drum in the drum frame in either a clockwise or a counterclockwise direction; a turntable assembly for allowing the drum frame to pivot about an axis generally perpendicular to the drum frame and assembly midway of the drum frame, with the turntable assembly including a first member in a rotatable relation to a second member and means for rotating and locking the second member relative to the first member about the turntable pivot axis, with the first member of the turntable assembly being attached to the drum frame; a main

frame member having a first end and a second end, with the second end of the main frame member being attached to the second member of the turntable assembly, with the first end of the main frame being adapted to extend to a point located generally below the frame of the tractor and in front of the front wheels of the tractor; a front frame attachment member for attachment to the frame of the tractor in front of the front wheels; wherein the front frame attachment member comprises, in combination: a U-shaped subframe having a central portion and upstanding vertical legs attached to the opposite ends of the central portion, tractor frame attachment members, and means for pivotally attaching the free ends of the vertical legs of the subframe to the tractor attachment members; means for attaching the first end of the main frame to the front frame attachment member for allowing swivelling of the main frame with respect to the front frame attachment member about a point located beneath the frame of the tractor and for allowing the turntable to pivot about a generally vertical axis; with the means for attaching the first end of the main frame to the front frame attachment member being positioned on the central portion of the U-shaped subframe; first and second hydraulic cylinders locatable on opposite sides of the tractor frme; means for attaching the upper ends of the hydraulic cylinders to the tractor frame for allowing pivotal and swivel movement of the hydraulic cylinders with respect to the tractor frame; and means for attaching the lower ends of the hydraulic cylinders to the second member of the turntable assembly allowing pivotal and swivel movement of the hydraulic cylinders with respect to the turntable assembly, with the hydraulic cylinder attaching means allowing the turntable assembly to sway in a horizontal plane locatable parallel to the landscape surface and in a direction generally perpendicular to the frame of the tractor, and with the hydraulic cylinders raising and lowering the drum frame in a generally vertical plane to be spaced from the landscape surface or to engage the landscape surface.

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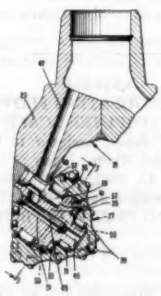
**4,516,640**

## ROTARY DRILL BIT

**Harry L. Karlsson, Sandviken, Sweden, assignor to Santrade Ltd., Switzerland**

**Filed Dec. 8, 1983, Ser. No. 559,483**
**Int. Cl.[3] E21B** *10/22*
**U.S. Cl. 175—227** **19 Claims**



1. A rotary drill bit comprising at least one roller cutter which is rotatably carried on a bearing pin over a bearing system, said bearing system comprising at least a forward bearing and a rear bearing, said rear bearing being a roller bearing, at least one inflow passage being provided in a bit body, at least one outflow passage, means for supplying fluid through the at least one inflow passage to the rear bearing during operation of the bit to establish a flow of the fluid from the inflow to the outflow passage for flushing and for aiding cooling of the rear bearing, the bearing pin including a flange for axially fixing a forward end of the rollers of the rear bearing, said inflow passage including a plurality of radially extending passages arranged in the flange, the radially extending passage terminating in the bearing system ahead of the forward end of the rear bearing between intermediate sealing means and the outflow passage, said sealing means separating the bearing system into a forward bearing space and a rear bearing space, and the forward bearing space being filled with lubricant.

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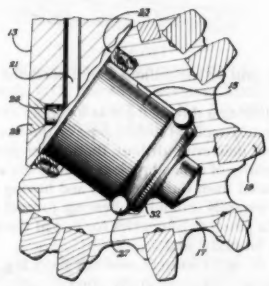
**4,516,641**

## EARTH BORING BIT WITH PRESSURE COMPENSATING RIGID FACE SEAL

**Bruce H. Burr, Houston, Tex., assignor to Hughes Tool Company-USA, Houston, Tex.**

**Filed Oct. 17, 1983, Ser. No. 542,801**
**Int. Cl.[3] E21B** *10/08;* **F16J** *15/16*
**U.S. Cl. 175—228** **12 Claims**



5. An earth boring bit with an improved seal means and pressure compensating system, said bit comprising:

a body;

a cantilevered bearing shaft extending obliquely inwardly and downwardly from the body;

a cutter secured for rotation about the bearing shaft, with axial and radial play due to clearances;

a lubrication system in the body, including a hydrostatic pressure compensator;

a seal groove including a pair of an inclined, contoured and oppositely facing circumferential walls, one located on the cutter and the other on the bearing shaft, each of which intersects a generally radial end wall;

a pair of metal rings positioned in the seal groove and having opposed, sealing faces and inclined, contoured circumferential portions, which oppose, but are spaced radially from, the circumferential walls on the cutter and shaft;

a pair of O-ring type resilient energizer rings, each of which sealingly and continuously engages a respective one of the inclined, contoured walls of the seal groove and the opposed inclined, contoured portion of one of the metal rings to define a seal assembly positioned between the end walls of the seal groove;

the seal assembly being exposed to and biased axially by dynamic pressure differentials between the lubricant and the ambient drilling fluids;

the axial width of the engaged rigid rings and seal assembly being less than the axial, minimum width of the seal groove when the cutter is thrust outwardly on the bearing shaft to define at least one axial clearance to permit unrestricted axial movement of the rigid rings between the end walls of the groove when the cutter moves relative to the bearing shaft.

**4,516,642**

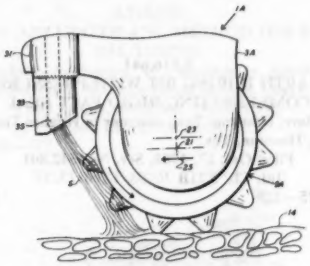
## DRILL BIT HAVING ANGLED NOZZLES FOR IMPROVED BIT AND WELL BORE CLEANING

**John S. Childers, Greenville, and Paul E. Pastusek, Houston, both of Tex., assignors to Reed Rock Bit Company, Houston, Tex.**

**Continuation-in-part of Ser. No. 132,950, Mar. 24, 1980, abandoned. This application Nov. 1, 1982, Ser. No. 437,927**

**Int. Cl.³ E21B *10/18***

**U.S. Cl. 175—340** **14 Claims**



1. A rotary drill bit for drilling a well bore, the bit comprising:

a bit body having a threaded pin at its upper end adapted to be detachably secured to drill pipe or the like for rotating the bit and delivering drilling fluid under pressure to the bit, a plurality of depending legs at its lower end, each leg being spaced from the other legs and having an inwardly and downwardly extending bearing journal at its lower end, and a plurality of nozzles for exit of the drilling fluid from the bit body; and

a plurality of roller cutters, one for each leg, each roller cutter comprising a generally conical cutter body rotatably mounted on the bearing journal of the respective leg and a plurality of cutting elements on the body;

each of said nozzles having a nozzle orifice below the top of an adjacent roller cutter but above the central axis of the respective bearing journal at its outer end with respect to the bit body, each nozzle directing the drilling fluid to flow downwardly in a stream flowing past the cutter body of the adjacent roller cutter along a line generally tangent thereto and thereafter impinging portions of the bottom of the well bore forward, with respect to the direction of rotation of the bit, of all points at which the cutting elements of the adjacent roller cutter then engages the bottom of the bore, whereby the drilling fluid sequentially impinges and cleans cutting elements on the adjacent roller cutter and then the well bore bottom immediately prior to the engagement of said portions of the well bore bottom by the cutting elements for enhanced drill bit cutting action.

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**4,516,643**

## COMBINATORIAL WEIGHING METHOD AND APPARATUS

**Yukio Nakagawa, Kyoto, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan**

**Filed Jun. 22, 1983, Ser. No. 506,796**

**Claims priority, application Japan, Jun. 23, 1982, 57-107790; Dec. 11, 1982, 57-217581**

**Int. Cl.³ G01G *9/00, 19/22, 19/413, 19/417***

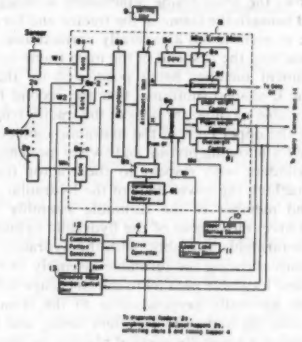
**U.S. Cl. 177—1** **17 Claims**

1. A combinatorial weighing method in which weight data from N weighing machines (where N is an integer) containing articles are combined to obtain an optimum combination of weighing machines having a total combined weight value of articles equal to a preset value Wa or closest to the preset value Wa within preset allowable limits, the articles being discharged from the obtained optimum combination of weighing machines, comprising the steps of:

(a) forming combinations of i weighing machines from among the N weighing machines, where i is a specific number of weighing machines which tends to afford the optimum combination more readily than other numbers of the weighing machines, and where i is an integer less than N;

(b) generating continuously only combinations which select i weighing machines from among the N weighing machines;

(c) determining whether the total weight value of each combination composed of the i weighing machines falls within the preset allowable limits;



(d) assigning the total weight of each of the combinations generated to one of an overweight rank which is outside the preset allowable limits on the high side, a proper weight rank which is within the preset allowable limits, and an underweight rank which is outside the preset allowable limits on the low side;

(e) counting the occurrence of weight values in each of the overweight, proper weight and underweight ranks;

(f) storing an optimum combination which is within the preset allowable limits; and

(g) discharging articles based on the stored optimum combination from among all combinations composed of i weighing machines.

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**4,516,644**

## APPARATUS FOR REGULATING FLOW OF ARTICLES IN COMPUTER SCALE

**Masao Fukuda, Shiga, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan**

**Filed Dec. 13, 1982, Ser. No. 449,253**

**Claims priority, application Japan, Dec. 17, 1981, 56-204988**

**Int. Cl.³ G01G *19/22, 13/02*; B67D *3/00***

**U.S. Cl. 177—25** **10 Claims**

1. A computer scale of the combinatorial weighing type, comprising:

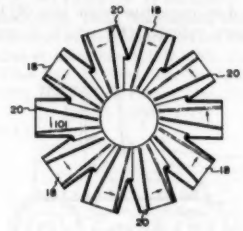
a dispersing table for dispersing articles to be weighed, said dispersing table having a center;

a supply feeder, having a plurality of supply troughs extending radially from said dispersing table, for receiving articles from said dispersing table;

a plurality of regulating plates respectively associated with and disposed in the supply troughs, for regulating the flow of articles in the supply trough, said regulating plates being approximately the same length as said supply troughs and rotatable around a center of rotation which is offset from said center of said dispersing table;

a plurality of pool hoppers respectively associated with said supply troughs for receiving articles from said supply troughs;

a plurality of weighing hoppers respectively associated with said pool hoppers for receiving the articles from said pool hoppers; and



a plurality of weighing mechanisms respectively associated with said weighing hoppers for measuring the weights of the articles received by said weighing hoppers.

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**4,516,645**

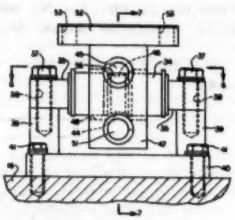
**LOAD CHECKING ARRANGEMENT FOR A CENTER-LOADED TYPE LOAD CELL**

**Donald C. Wetzel, Berea, Ohio, assignor to Quest Corporation, Macedonia, Ohio**

**Continuation-in-part of Ser. No. 314,361, Oct. 23, 1981, Pat. No. 4,413,691. This application Nov. 7, 1983, Ser. No. 549,671**

**Int. Cl.³ B66C *1/40*; G01G *21/12***

**U.S. Cl. 177—147** **22 Claims**



1. A weighing system, which comprises:

a load-bearing member attached to and supported by support means;

a plurality of center-loaded load cells fixed on the load bearing member;

a plurality of load rods, each load rod extending across and supported on one of the load cells, each load rod having a centering recess therein; and

a load supporting member supported on the load rods, the load supporting member capable of lateral movement with respect to the load bearing member, the centering recess of the load rod tending to urge the load supporting member back to its original position with respect to the load bearing member when such lateral movement occurs.

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**4,516,646**

**SHEAR BEAM LOAD CELL WITH BUILT-IN BEARING ELEMENTS**

**Björn Bergfalk, Karlskoga, Sweden, assignor to Aktiebolaget Bofors, Bofors, Sweden**

**Filed Mar. 7, 1983, Ser. No. 472,694**

**Claims priority, application Sweden, Mar. 7, 1982, 8201365**

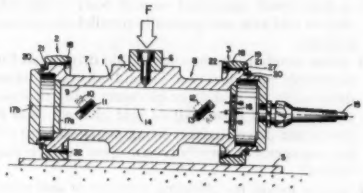
**Int. Cl.³ G01G *3/14, 21/02***

**U.S. Cl. 177—211** **7 Claims**

1. A load cell comprising:

a beam-shaped measuring body including strain gages for providing electrical signals in response to a shear force applied through said measuring body by a measurement force, and

first and second cylindrical end pieces supporting said measuring body through first and second built-in bearing means above a support surface, said end pieces having a



diameter which maintains said measuring body above said support surface when deflected by an applied measuring force, and said built-in bearing means preventing said measuring body from measuring extraneously applied forces.

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**4,516,647**

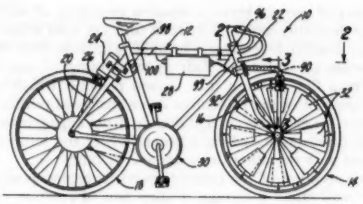
**SOLAR POWERED VEHICLE**

**Thaddeus Novak, P.O. Box 487, Dearborn, Mich. 48121**

**Filed Feb. 8, 1982, Ser. No. 346,659**

**Int. Cl.³ B60L *9/00***

**U.S. Cl. 180—2.2** **9 Claims**



1. A vehicle comprising:

a frame,

a wheel rotatably mounted to said frame,

an electrical load secured to said frame,

means for converting solar energy to electrical energy secured to said wheel, and

means for electrically connecting said converting means to said load despite rotation of said wheel.

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**4,516,648**

**CHILD'S RIDE-ON TOY WITH REVERSING DRIVE FOR REAR WHEELS**

**Hans S. Berger, Plainville; Frank Mercurio, and Norbert L. Reiner, both of Wallingford, all of Conn., assignors to Coleco Industries, Inc., West Hartford, Conn.**

**Filed Apr. 25, 1983, Ser. No. 488,050**

**Int. Cl.³ B62D *11/04***

**U.S. Cl. 180—6.66** **19 Claims**

1. In a child's motor powered vehicle, the combination comprising:

A. a body adapted to seat a child with the legs supported thereon;

B. a first wheel assembly;

C. means mounting said first wheel assembly on said body for pivoting about a vertical axis;

D. an axle supported on said body in spaced relationship to said first wheel assembly;

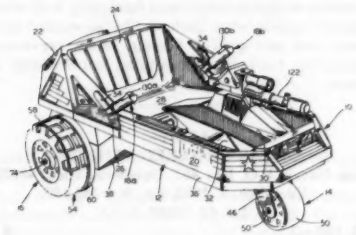
E. a pair of drive wheels rotatably supported on said axle,

said wheels each having a drive portion on the inner face thereof including a concentric annular channel extending axially about said axle, said channel being defined by a base wall and a pair of radially spaced opposed walls providing drive surfaces extending coaxially about said axle;

F. a drive shaft supported on said body in spaced relationship to said axle and generally parallel thereto in its at rest position;

G. drive members on the ends of said drive shaft for rotation therewith and disposed in said channels adjacent said drive surfaces, said drive elements being of lesser dimension than said base wall of said channel, said drive elements and drive surfaces being engageable to effect driving engagement therebetween upon surface engagement thereof;

H. power means for effecting rotation of said drive shaft in one direction of rotation;



I. a pair of control levers extending upwardly of said body and pivotably mounted thereon adjacent their lower ends, said control levers each being engageable with an end portion of said drive shaft upon pivoting of said levers from a first position to a second position which effects movement of the respective drive shaft end portions and the drive elements carried thereby from engagement with one drive surface of the adjacent wheel and into engagement with the other drive surface thereof,

whereby pivoting of the control levers from one position to another will effect a change in direction of rotation of that wheel and positioning of the two control levers to effect engagement of the drive elements with opposite drive surfaces on said rear wheels will effect rotation of the wheels in opposite directions and turning of the vehicle, and whereby positioning of the control levers to effect engagement of the drive elements with the same drive surfaces will effect generally straight line motion of the vehicle forwardly and rearwardly.

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**4,516,649**

## TERRAIN-TRAVELLING MOTOR VEHICLE

**Thor F. Braathen, N-3358 N. Eggedal, Norway**

**PCT No. PCT/NO82/00026, § 371 Date Dec. 21, 1982, § 102(e) Date Dec. 21, 1982, PCT Pub. No. WO82/04022, PCT Pub. Date Nov. 25, 1982**

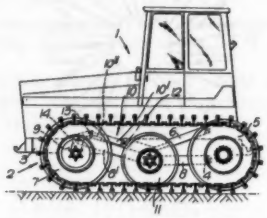
**PCT Filed May 11, 1982, Ser. No. 457,108**

**Claims priority, application Norway, May 11, 1981, 811604**

**Int. Cl.³ B62D** *55/30*

**U.S. Cl. 180—9.1** **2 Claims**

1. In a terrain-travelling motor vehicle (1) having twin caterpillar tracks and bogie assemblies (2) pivotally attached to the frame (3) of the vehicle and comprising a rear pair of drive wheels (5) mounted on the frame (3) of the vehicle, and a front pair of wheels (7) wherein each wheel of said front pair is supported on a pivotable belt-tensioning arm (9) at the forward end of a bogie arm (8) for each bogie assembly (2), the rearward end of said arm (8) being supported by means of shaft journals (4) proximate to and in front of the center axis of the rear pair of wheels (5), each belt-tensioning arm (9) and bogie arm (8) being movable in the vertical plane by means of a hydraulic pressure cylinder (6) for pivoting the bogie assemblies upwardly and downwardly simultaneously or independently of each other and for tautening the bogie tracks; the improvement in which each belt-tensioning arm (9) is movable independently of its respective bogie arm (8) by means of a hydraulic pressure cylinder (10) which is pressurized at a



desired adjustable pressure for maintaining a desired tautness in the belt during the pivoting movement of the bogie arm (8), as well as during the continual changes in configuration of the lower perimeter of the track which occur as the vehicle drives over irregular ground terrain.

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**4,516,650**

## VEHICLE BODY STRUCTURE FOR PREVENTING WATER SUCTION INTO AN AIR CLEANER

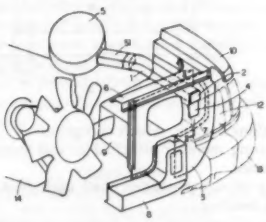
**Hitohisa Yamaguchi; Kenichiro Fuse, both of Toyota, and Takeshi Yoshida, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Jun. 16, 1983, Ser. No. 504,822**

**Claims priority, application Japan, Sep. 15, 1982, 57-139351[U]**

**Int. Cl.³ B60K** *13/02*

**U.S. Cl. 180—68.3** **17 Claims**



1. A vehicle body structure for preventing suction of exterior water into an air cleaner installed in the vehicle, comprising:

an air cleaner for introducing outside air into an engine;

a radiator support panel extending laterally across the vehicle;

an air cleaner duct connected to the air cleaner at one of its ends and extending to the radiator support panel at its other end for permitting air to flow through said air cleaner duct; and

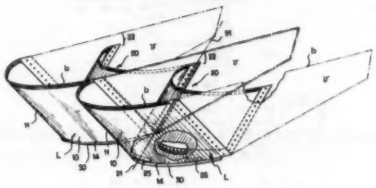
said radiator support panel including a longitudinally extending passage having an open forward end and an open rearward end, said open forward end being located adjacent to and just below said other end of said air cleaner duct and said open rearward end communicates with a road surface which the vehicle traverses, whereby water rising along the radiator support panel enters the open forward end of said longitudinally extending passage and is returned to the road surface by passing through said passage and out said open rearward end thereof.

**4,516,651**

## VEHICLES TRAVELLING ON AIR CUSHIONS ALLOWING MOVEMENT OF THE LATTER OVER ALL TYPES OF TERRAIN

**Claude M. Duchateau, Rueil Malmaison, France, assignor to Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestres et Amphibies S.E.D.A.M., Paris, France**

**Filed Dec. 20, 1982, Ser. No. 451,256**
**Claims priority, application France, Dec. 23, 1981, 81 24134**
**Int. Cl.³ B60V *1/16***
**U.S. Cl. 180—127** **12 Claims**



1. In a ground effect vehicle including a vehicle structure and a lifting arrangement supporting the structure, the improvement wherein said lifting arrangement comprises:

(a) at least one multilobular skirt having a plurality of first lobes open toward the inside of the vehicle, each said first lobe including side walls having a lower part which converges in a downward direction with respect to the structure; and

(b) anti-damage lobes disposed at least at the rear of the vehicle on the inside of said first lobes;

said anti-damage lobes diverging in a downward direction with respect to the structure at an inclination such that the values of the angles formed by the respective outermost generatrices of the two lobes with respect to the vertical are substantially equal;

said anti-damage lobes having a concave shape toward the inside of the vehicle and having a lower part and an upper part; and

wherein each anti-damage lobe is connected laterally and along a rectilinear connection to the side walls of an associated first lobe and by its lower part to the base of the associated first lobe in a horizontal plane.

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**4,516,652**

## APPARATUS FOR CONTROLLING THE SPEED OF AN AUTOMOBILE

**Kou Tanigawa, Akashi; Jiro Masuda, Kobe; Kazumasa Nakamura, Okazaki, and Kazuhiko Hayashi, Toyota, all of Japan, assignors to Fujitsu Ten Limited, Kobe and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan**

**Filed Dec. 21, 1982, Ser. No. 451,839**
**Claims priority, application Japan, Dec. 21, 1981, 56-207563; Dec. 26, 1981, 56-214983; Jan. 25, 1982, 57-10637**
**Int. Cl.³ B60K *31/00***
**U.S. Cl. 180—177** **24 Claims**

1. In an automobile having transmission gears, wherein a reduction ratio establishes a relationship between said gears, an apparatus for controlling the speed of an automobile so that said automobile conforms with a preset speed when a resume switch is manipulated, said apparatus comprising:

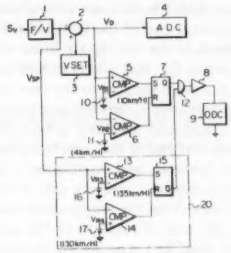
a speed-detecting means for generating a signal representing the actual speed of the automobile;

a memory means for storing data corresponding to said preset speed;

a speed-difference detecting means for detecting the difference between said preset speed and the actual speed of the automobile on the basis of said signal generated by said speed-detecting means and said data stored in said memory means;

a switching means for switching the reduction ratio of the gears on the basis of an output signal generated by said speed-difference detecting means; and

a gating means for transferring said output signal generated by said speed-difference detecting means to said switching means, said switching means decreasing the reduction



ratio when said actual speed approaches said preset speed and increasing the reduction ratio when said actual speed becomes a predetermined value less than said preset speed and when a speed related predetermined condition of the automobile is established.

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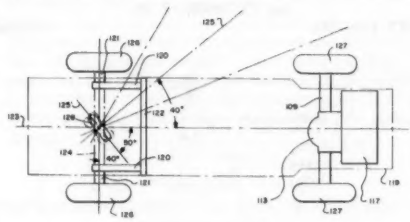
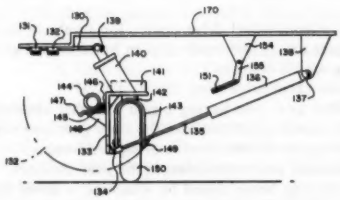
**4,516,653**

## VEHICLE MOUNTED PARKING DEVICE FOR USE ON FRONT WHEEL DRIVE VEHICLES

**Brooks Walker, 1280 Columbus Ave., San Francisco, Calif. 94133**

**Continuation-in-part of Ser. No. 394,529, Jun. 2, 1982, abandoned. This application Mar. 29, 1984, Ser. No. 594,691**
**Int. Cl.³ B60K *7/00***
**U.S. Cl. 180—199** **20 Claims**





1. A vehicle mounted parking device for use on a front wheel drive motor vehicle having motive means, frame means, yieldable means for yieldable supporting the rear end of the vehicle attached to said frame means, rear axle means carried by the yieldable means for yieldably supporting the rear end of the vehicle, at least two rear wheels rotatably attached to said rear axle means, at least two front wheels, steering means for selectively directing the front wheels of the vehicle, and motive means for selectively applying power to certain of the

wheels, the device comprising a wheel mount, an auxiliary wheel rotatably supported on said wheel mount, mounting means adapted to be carried by the rear portion of the vehicle for supporting the wheel mount for movement of the auxiliary wheel between an operative ground engaging and rear end of the vehicle lifting position and out-of-the-way position, power means connected to the wheel mount to cause the wheel mount to be moved from the out-of-the-way position to the ground engaging and rear end of the vehicle lifting position, whereby the rear wheels of the vehicle are lifted off the ground and the mounting means for said wheel mount engages the rear axle means and provides support to the rear portion of the vehicle through the yieldable means for supporting the rear portion of the vehicle, and said auxiliary wheel when in said ground engaging and rear end of the vehicle lifting position is disposed substantially between and equidistant from each of the rear wheels and is disposed with its axis of rotation inclined at a substantial angle from the longitudinal center line of the vehicle so that the axis of rotation of the auxiliary wheel passes between the front and rear wheels on one of two sides of the vehicle, said vehicle moving generally in a sidewise direction when the auxiliary wheel is in said ground engaging and vehicle lifting position and when said front wheels are directed by said steering means in a direction similar to the auxiliary wheel and power is applied to the front wheels from the motive means to cause rotation of the front wheels.

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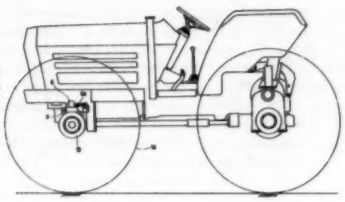
**4,516,654**

## FRONT-WHEEL DRIVE DEVICE FOR VEHICLE

**Tadao Nishihara, Ehime, Japan, assignor to Iseki & Co., Ltd., Japan**

**Filed Jul. 8, 1983, Ser. No. 512,039**
**Claims priority, application Japan, Oct. 9, 1982, 57-177728**
**Int. Cl.³ B60K *17/30***
**U.S. Cl. 180—255** **3 Claims**



1. In a front-wheel drive device for a vehicle in which an inner gear case is mounted onto an outer end of a front axle housing which contains

a front-wheel drive axle,

an outer gear case having a gear chamber opening toward the outside and fitted onto the inner gear case while maintaining the freedoms of steering and turning,

a planetary gear mechanism in the gear chamber,

the opening being closed by attaching a cover supporting the front wheel axle over the outer gear case, and

the front wheel axle being driven at a reduced speed by the planetary gear mechanism via a bevel gear mechanism driven by the front-wheel drive axle,

the improvement wherein

an inner member of the front wheel axle extends into the gear chamber, and

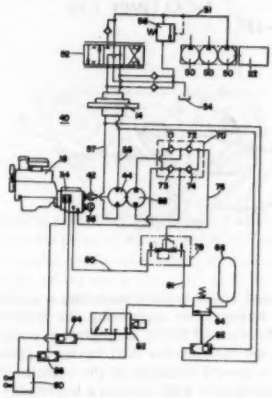
the sun gear of the planetary gear mechanism and the bevel gear mechanism are allowed to freely rotate as a unitary structure about the inner member.

**4,516,655**

## REMOTE DRIVE WITH POWERSHIFT TRANSMISSION

**John M. Donahue, Strasburg, and Michael J. Gagner, New Philadelphia, both of Ohio, assignors to The Gradall Company, New Philadelphia, Ohio**

**Filed Aug. 12, 1983, Ser. No. 522,921**
**Int. Cl.³ E02F *3/00***
**U.S. Cl. 180—321** **9 Claims**



1. A material handling vehicle comprising:

a power driven chassis having a main cab;

an upper structure supported by said chassis and being moveable relative thereto having an operator cab;

the main drive engine supported on said power driven chassis;

a powershift transmission connected to be driven by said main engine having a power takeoff;

a swing bearing connecting said chassis and said upper structure;

an upper hydraulic power supply disposed on said upper structure providing an output of pressurized hydraulic fluid;

a hydraulic torque motor disposed on said chassis connected to be driven by pressurized hydraulic fluid supplied from said upper hydraulic power supply;

said hydraulic torque motor connected to provide power to the power takeoff connection on said powershift transmission and driving a hydraulic pump;

said hydraulic pump providing a pressurized output of hydraulic fluid and supplying said hydraulic fluid to the transmission lubrication system and the transmission gear range control clutches.

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**4,516,656**

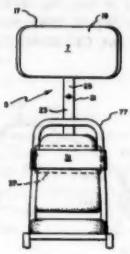
## ACOUSTICAL ATTENUATING DEVICE AND CHAIR EQUIPPED THEREWITH

**Bernard Fleshler, 67 Covington Rd., Buffalo, N.Y. 14216**

**Filed Dec. 9, 1982, Ser. No. 448,320**
**Int. Cl.³ G10K *11/00***
**U.S. Cl. 181—175** **21 Claims**

1. A sound attenuating device affixable to the back of a chair, which comprises a generally arched shaped acoustic pad having a rear sound shield and a frontal sound absorption panel, the pad being sufficiently arched to circumscribe the backside

of the user's head and ears without covering the side of the user's head, said device including means for mounting the pad



over the chair back such that the frontal sound absorption panel is proximate to the user's head.

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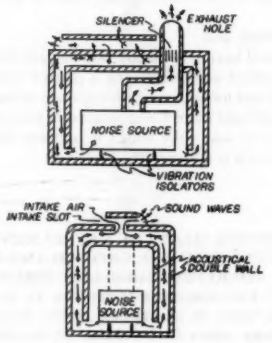
**4,516,657**

## SOUND SUPPRESSION OF ENGINE NOISE

**Edward F. Allard, 7830 Greeley Blvd., Springfield, Va. 22152**

**Filed Sep. 29, 1982, Ser. No. 428,073**
**Int. Cl.³ F01N** *1/02, 1/24*
**U.S. Cl. 181—204** **5 Claims**




1. A sound suppressor including:

a first means for totally encasing a device generating a noise to be suppressed;

a second means encasing said first means and the noise generating device whereby a space is provided between the two encasements;

sound attenuating and absorbing material cover the outer surface of the first encasement means and the inner surface of the second encasement means;

said second means containing intake vents for communicating with the outside environment;

said first means containing vents for communicating with the space between the first and second encasements, whereby air is caused to flow from the outside of the second encasement through the intake vents thereof, through the space between the two encasements and through the vents of the first encasement into the first encasement containing the noise generating device where the air is used to cool and supply combustion to the noise generating device and is then directed out of the encasements through exhaust means associated with said device into the outside environment;

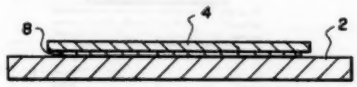
said exhaust means having a minimized opening where exiting from the encasement means for maximum sound attenuation.

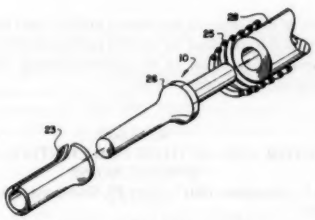
**4,516,658**

## COULOME FRICTION NOISE AND VIBRATION DAMPING

**Henry A. Scarton, Troy; John A. DiBianca, Webster, both of N.Y.; James A. Lacey, Pittsburgh, Pa., and Warren C. Kennedy, Schenectady, N.Y., assignors to Rensselaer Polytechnic Institute, Troy, N.Y.**

**Filed Feb. 28, 1983, Ser. No. 470,515**
**Int. Cl.³ F16F** *15/00*
**U.S. Cl. 181—208** **24 Claims**




1. A device for reducing noise generated by transverse vibrations in an elongated rod-like member having an annular member surface which undergoes bending due to such transverse vibrations, comprising:

a friction ring having an inner friction surface engaged with the annular member surface; and

retaining means associated with said friction ring for establishing a selected normal force between said friction surface and the member surface to increase a frictional engagement therebetween so that bending of the member surface due to transverse vibrations produces frictional sliding between said friction surface and the member surface.

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**4,516,659**

## REPLACEMENT MUFFLER AND PROCESS FOR MAKING SAME

**James R. Hall, Toledo, Ohio; Donald P. Harter, Ottawa Lake, Mich.; Michael W. Clegg, Toledo, and James E. Gerber, Walbridge, both of Ohio, assignors to APX Group, Inc., Toledo, Ohio**

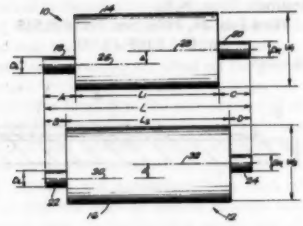
**Division of Ser. No. 405,925, Aug. 6, 1982. This application Feb. 6, 1984, Ser. No. 577,281**
**Int. Cl.³ F01N** *7/18*
**U.S. Cl. 181—243** **2 Claims**

1. A replacement muffler adapted to replace an original equipment muffler with substantially no modifications to said replacement muffler after its manufacture, said replacement muffler comprising:

(i) a replacement muffler body which only approximates the body of said original equipment muffler, said replacement muffler body comprising an outer casing and internal portions disposed therein;

(ii) a pair of replacement muffler heads fixedly mounted on opposed ends of said replacement muffler body, said replacement muffler heads each being provided with a nipple aperture, said nipple apertures in said replacement muffler heads being at predetermined locations offset from each other by a distance substantially equal to the corresponding distance on said original equipment muffler; and

(iii) a pair of replacement muffler nipples fixedly secured to said replacement muffler heads at the nipple apertures thereof, said replacement muffler nipples having diameters substantially equal to the corresponding nipple diameters of said original equipment muffler, and having lengths adapted to produce an overall replacement muffler length substantially equal to the corresponding length of said original equipment muffler.



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**4,516,660**

## EJECTOR AND METHOD FOR CONTROLLING JET ENGINE NOISE

**Alfred L. Greenlaw, 12017 210th Pl. Southeast, Issaquah, Wash. 98027**

**Continuation of Ser. No. 189,105, Sep. 22, 1980, abandoned. This application Mar. 14, 1983, Ser. No. 475,711**

**Int. Cl.³ G10K *11/00*; B63H *25/46***

**U.S. Cl. 181—296** **3 Claims**

1. A method for suppressing the noise of the exhaust of a jet engine at all frequencies with a minimum loss of thrust wherein the diameter of an ejector is selected for a particular jet engine such that the length of the mixing section or zone of the ejector is adequate for practical installation in jet aircraft, comprising:

providing a primary nozzle section delivering at least one jet of engine exhaust gases at a predetermined velocity, temperature and pressure into the mixing zone of the ejector,

providing means to deliver a secondary gas stream at a predetermined velocity, temperature and pressure into the mixing zone of the ejector,

selecting the diameter of the ejector in relation to its length to have a mixing section or zone length equal to about one diameter of the ejector and in relation to the predetermined velocities, temperatures and pressures of the primary and secondary gas flows to achieve a choked flow (Mach 1.0) condition of the mixture of primary and secondary gases at the end of the mixing zone, thereby utilizing the gas flow characteristics in the Mach 1.0 transistion to obtain rapid mixing of the primary and secondary gas flows in the mixing zone, and

discharging the mixed gas stream into a diffusion zone downstream from the mixing zone having an expanding area section greater than that of the mixing zone, a normal shock occurring in the diffusion zone, with the location of the shock being at a point in the diffusion zone prior to when the gas mixture slows down in the expanding diffusion zone to where the mixed gas stream static pressure equals the ambient static pressure at the end of the diffusion zone.

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**4,516,661**

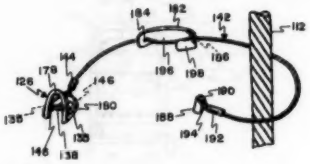
## SAFETY DEVICE FOR SCAFFOLD

**Lawrence R. Stafford, 8 Gracemore St., Albany, N.Y. 12203**

**Continuation-in-part of Ser. No. 415,756, Sep. 7, 1982. This application Sep. 2, 1983, Ser. No. 529,010**

**Int. Cl.³ E04G *5/04***

**U.S. Cl. 182—82** **7 Claims**



1. A safety system, comprising:

(a) a plurality of anchors having support posts and heads and secured to and disposed vertically at spaced intervals along the outside surface of a building;

(b) yoke means a generally U shaped yoke configured and dimensioned to be fitted on and secured around one of said plurality of anchors, with a side of said yoke facing said building, having a pair of holes at its ends;

(c) spring means comprising a coil spring with each of the ends of said spring positioned adjacent one of the holes of said yoke for maintaining said yoke on its respective anchor;

(d) a scaffold; and

(e) a lanyard having two ends, said lanyard being secured to said scaffold and comprising a pair of loops at its ends, each of said loops passing through one of said holes of said yoke, and said loops being secured to said spring adjacent the side of said yoke which is opposite the side of said yoke which is adjacent the building.

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**4,516,662**

## ROD-CLAMPING MEANS OF A PERCUSSIVE AIR TOOL FOR DRIVING INTO THE GROUND AND REMOVING THEREFROM ROD-LIKE PIECES

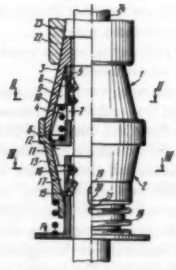
**Alexandr D. Kostylev, ulitsa Derzhavina 18, kv. 44; Jury N. Syryamin, ulitsa D. Kovalchuk, 266/1, kv. 51; Boris N. Smolyanitsky, ulitsa O. Dundicha, 27, kv. 18; Vladimir P. Boginsky, ulitsa Tsvetnoi proezd, 17, kv. 62, and Alexei D. Terskov, ulitsa Ippodromskaya, 31, kv. 154, all of Novosibirsk, U.S.S.R.**

**Filed Feb. 24, 1983, Ser. No. 469,577**

**Claims priority, application U.S.S.R., Mar. 1, 1982, 3402727**

**Int. Cl.³ E21B *1/00***

**U.S. Cl. 173—53** **9 Claims**



1. A rod-clamping means of a percussive air tool for driving

into the ground and removing therefrom rod-like elements comprising:

an assembly for transmitting impact loads to a rod being driven into the ground;

said impact load transmission assembly including a housing having a through axial cavity, a system of jamming elements, and a sleeve;

an assembly for taking up recoil forces from the percussive air tool;

said recoil force take up assembly including a housing having a through axial cavity, a system of jamming elements and a collar sleeve; and

separate resilient means in the said two assemblies for urging said systems of jamming elements to said housings and said rod.

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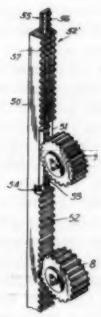
**4,516,663**

## SAFETY DEVICE

**Michael D'Alessio, Flushing, and Charles Matcovich, Pearl River, both of N.Y., assignors to Harsco Corporation, Camp Hill, Pa.**

**Filed Mar. 15, 1982, Ser. No. 358,311**
**Int. Cl.³ B66B *11/04***
**U.S. Cl. 187—19** **19 Claims**



1. A drive overload safety device for personnel hoists incorporating a rack and a drive pinion of the type further carrying a safety pinion for continuous engagement with said rack below said drive pinion, comprising disengaging means for disengaging said drive pinion from said rack approximately at a predetermined height of said hoist in response to a predetermined excess drive load on said drive pinion thereat, said means comprising a disengagable portion of said rack having teeth drivingly disengagable by being displaced relative to the remaining portion of said rack by said drive pinion when the latter is subjected to said predetermined excess drive load and is positioned on said rack at said approximate predetermined height, and at least that part of the rack adjacently above the disengagable portion having teeth more resistant to being displaced by said drive pinion so as to safely support said personnel hoist particularly when subject to precipitous descent.

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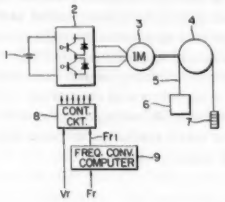
**4,516,664**

## APPARATUS FOR CONTROLLING AN A-C POWERED ELEVATOR

**Nobuo Anzai, and Hiroyuki Ikejima, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Mar. 9, 1983, Ser. No. 473,723**
**Claims priority, application Japan, Apr. 30, 1982, 57-72928**
**Int. Cl.³ B66B *5/02***
**U.S. Cl. 187—29 R** **6 Claims**

1. An improved apparatus for controlling an AC powered elevator, the apparatus being of the type having an inverter connected to a DC power supply, the inverter being controlled by a varying voltage instruction value and a varying frequency instruction value, DC electric power being inverted by said inverter into AC electric power having a variable voltage and a variable frequency, and an AC electric motor energized by the thus inverted AC electric power so as to drive an elevator cage, wherein the improvement comprises:




a frequency converter which, when said frequency instruction value is a frequency value within a range developing resonance in a mechanical system of the elevator, provides said inverter with a converted frequency instruction value lying outside the resonance frequency range of said mechanical system, so as to suppress resonance in said system.

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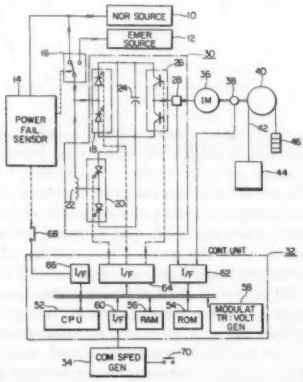
**4,516,665**

## ELEVATOR CONTROL SYSTEM

**Eiki Watanabe, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 1, 1984, Ser. No. 607,113**
**Claims priority, application Japan, May 10, 1983, 58-81409**
**Int. Cl.³ B66B *5/00***
**U.S. Cl. 187—29 R** **12 Claims**




1. An elevator control system comprising a normal power source for generating an AC power at a constant voltage, a converter for converting the AC power from said normal power source to a DC power having a variable voltage, an inverter for inverting said DC power with said variable voltage to an AC power having a variable voltage and a variable frequency, and an induction motor for an elevator car driven and controlled by said inverter wherein there are provided power failure sensor for sensing the occurrence of a power failure on said normal power source and generating a power failure indicating signal; an emergency power source for generating an AC power during a power failure occurring on said normal power source; a change-over switch disposed between said normal and emergency power sources and said converter to change the connection of said converter so that a power

supply to said converter is effected by either one of said normal and emergency power source, said change-over switch performing the change-over operation in response to the power failure indicating signal from said power failure sensor so that, when the normal power source is normally operated, said normal power source supplies an electric power to said converter and that, when a powers failure occurs on said normal power source, the emergency power source supplies an electric power to said converter; and a control unit for applying a control signal to said converter to deliver said DC power having said variable voltage, said control unit being responsive to said power failure indicating signal from said power failure sensor to supply a signal to said converter so as to cause said converter to generate a DC voltage higher than that generated by said converter when the latter receives the power supply from said normal power source.

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**4,516,666**

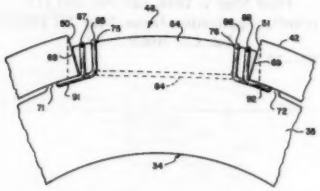
## DISC BRAKE ANTI-RATTLE MEANS

**David D. Sheill, Farmington Hills, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 487,551, Apr. 22, 1983, abandoned, which is a continuation of Ser. No. 212,003, Dec. 1, 1980, abandoned. This application Jun. 25, 1984, Ser. No. 623,864**

**Int. Cl.³ F16D** *65/40*

**U.S. Cl. 188—73.38** **3 Claims**



1. In a disc brake, a rotor having axially spaced friction braking surfaces, a caliper including a leg extending radially inward adjacent a friction surface of said rotor, a wall extending radially inward adjacent the other friction surface and said rotor and a bridge straddling the periphery of said rotor and joining said leg and said wall, load applying means carried by said wall, a first friction pad between said leg of said caliper and said adjacent friction surface of said rotor, a second friction pad between said load applying means and said other friction surface of said rotor, each said friction pad comprising a backing plate having a tab extending radially outward therefrom bounded by circumferentially spaced, radially converging edges and a radially outer edge, friction material secured to a part of said backing plate, an aperture in said bridge defined on two sides by circumferentially spaced, axially extending, radially converging edges, said circumferentially spaced converging edges of said backing plate tabs slidably mounting said friction pads on said radially converging edges of said aperture and an anti-rattle spring clip having segments thereof formed to abut and abutting the radially outer edges of said first and second friction pad backing plate tabs in said aperture and other segments formed to extend radially inward and under said radially converging edges of said aperture to engage a surface of said bridge and spring load said segments abutting said first and second friction pad backing tabs thereby urging said circumferentially spaced converging edges of said friction pad backing plate(s) into anti-rattle abutment with said radially converging edges of said aperture.

**4,516,667**

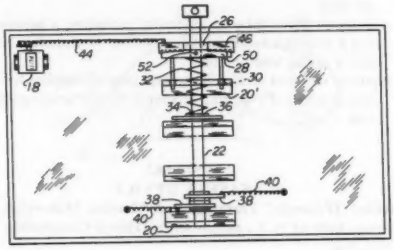
## ROTARY MOTION DAMPING MEANS

**William A. Lambertson, Pine Ridge Family Campground, Otts Shoals Rd. (Rte. 1), Roebuck, S.C. 29376**

**Filed Jul. 25, 1983, Ser. No. 517,068**

**Int. Cl.³ F16D** *63/00*

**U.S. Cl. 188—82.34** **11 Claims**



1. In a device including a member rotatable by force applied thereto in one direction about a fixed axis from a normally stopped position thereof and in opposition to a bias means tending to rotate said member in an opposite direction, damping means operable upon release of said applied force for checking return rotative movement of said member in said opposite direction to terminate said return movement at said normally stopped position without override therefrom, said damping means comprising a second member disposed in coaxial face-to-face, but non-rotatable relationship with said rotatable member, one of said rotary member and said second member being slideable axially relatively of the other,

bias force applying means normally urging said one of said members in to face-to-face contact with the other to establish frictional contact therebetween,

means carried on one of said members and operable during rotative movement of said rotatable member in said one direction to engage the other member and counter the effect of said bias force applying means for urging the axially slideable one of said members out of face-to-face engagement with the other, said last-mentioned means during return movement of said rotatable member disengaging from the said other member whereby frictional contact between the faces of said members is reestablished and absorbs the movement momentum in said rotatable member terminating said return movement when said rotatable member arrives at its normally stopped position.

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**4,516,668**

## KNOCK-DOWN COMBINATION HANDBAG AND MAT AND METHOD OF MAKING SAME

**Rose M. Grayek, 33 Happy Hollow Cir., Stratford, Conn. 06497**

**Filed Oct. 28, 1983, Ser. No. 546,278**

**Int. Cl.³ A47C** *17/82*

**U.S. Cl. 190—2** **10 Claims**

1. A combination knock-down handbag and mat comprising

a blank of foldable sheet material of a predetermined length and width which in the folded position thereof defines a handbag and in the knockdown position thereof a mat;

means defining a first pair of spaced apart seams extending transversely the width of said blank at a point intermediate the length of said blank and spaced from a transverse end thereof a distance equal to substantially the depth of the assembled handbag;

means defining a second pair of spaced apart seams extending longitudinally of said blank from said transverse end a distance substantially equal to twice the depth of the assembled handbag;

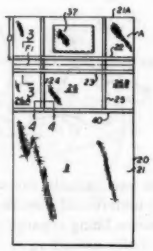
said blank of sheet material being reversely folded transversely along a foldline disposd intermediate said first pair

of transversely extending seams to define a doubled-over portion whereby said second pair of seams are deposed between said doubled-over portion; and an extended portion;

means for securing the doubled-over portion to one another to define a pocket having an open end;

said extended portion of said blank being reversely folded along a transversely extending foldline whereby said extending portion is gathered in one or more folds substantially equal in depth to the said doubled-over fold and disposed contiguous and congruent to said doubled over portion;

said contiguous folds and doubled over portion defining a center portion and opposed end portions whereby said end portions are reversely folded relative to said center portion and disposed contiguous thereto, and said pocket being turned inside out to define the assembled handbag whereby said reversely folded end portions are disposed within said pocket.



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**4,516,669**

## GEAR SHIFTING DEVICE

**Karl J. Boström, 24 Vretgatan, Skellefteå S-931 33, Sweden**

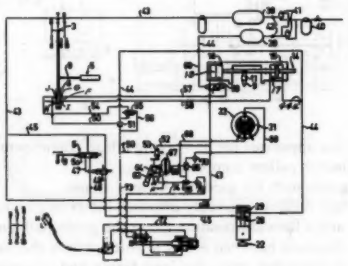
**PCT No. PCT/SE81/00113, § 371 Date Dec. 10, 1981, § 102(e) Date Dec. 10, 1981, PCT Pub. No. WO81/03000, PCT Pub. Date Oct. 29, 1981**

**PCT Filed Apr. 13, 1981, Ser. No. 333,857**

**Claims priority, application Sweden, Apr. 14, 1980, 8002794; Sep. 30, 1980, 8006835**

**Int. Cl.³ B60K *41/22***

**U.S. Cl. 192—3.58** **10 Claims**



1. A gear shifting device for a manual gearbox having a shifter, the shifting device comprising a side position cylinder for controlling the shifter in a sideways movement and a shift point cylinder for controlling the shifter movement perpendicular to the sideways movement, said cylinders having piston rods connected to said shifter and arranged perpendicular to each other for controlling its movement corresponding to a selected gear for its entering in the gearbox, said cylinders each comprising at least two pressure-medium actuated pistons connected to each other by a connecting rod, the pistons having a high pressure side and a low pressure side, said pistons being movable to one of two end positions for displacement of the piston rod of the respective cylinder in one of two directions, characterized in that the gearbox in a neutral position has one of the pistons in each cylinder centered in its cylinder chamber by the other piston, said other piston, by actuation from a first operating pressure at its high-pressure side, being held in one of its end positions, and that in the neutral position said one piston is at its low pressure side permanently actuated by a second operating pressure being greater than atmospheric and lower than the first operating pressure, said one piston being movable from its centered position to one of its two end positions together with said other piston in the respective cylinder, by the first operating pressure at selected sides of said one piston and said other piston carried out by a side position valve disposed on the side position cylinder and a shift point valve disposed on the shift point cylinder respectively, where the shift point valve admits the first operating pressure to the pistons of the shift point cylinder only after declutching, and that a clutch lock means is arranged to, depending on the motion of the piston of the shift point cylinder, stop the return of a clutch to engagement until the selected gear has been engaged in the gearbox.

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**4,516,670**

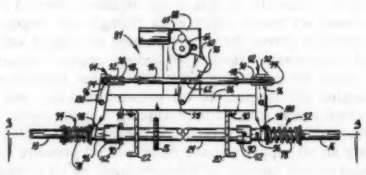
## MEANS FOR CONTROLLING ROW PLANTERS

**Edward C. Sorensen, Jr., Rte. 1, Box 5, Prescott, Iowa 50859**

**Filed Sep. 29, 1982, Ser. No. 427,775**

**Int. Cl.³ A01C *5/00*; F16D *11/10***

**U.S. Cl. 192—48.8** **8 Claims**



1. A planter selector device for use with a planter having a planter frame, a plurality of row planters on said frame, a first planter shaft drivingly connected to a first group of said planters and a second planter shaft drivingly connected to a second group of said planters, a drive shaft, power means for rotating said drive shaft, first clutch means movable from an engaged position drivingly connecting said power shaft to said first planter shaft to a disengaged position, second clutch means movable from an engaged position drivingly connecting said power shaft to said second planter shaft to a disengaged position, spring means yieldably urging said first and second clutch means to their engaged positions; said selector device comprising:

first and second actuator links movably connected to said frame, said first and second actuator links each having a pawl engaging one of said first and second clutches and being movable from a first position to a second position to cause said one clutch to move from its said engaged position to its said disengaged position;

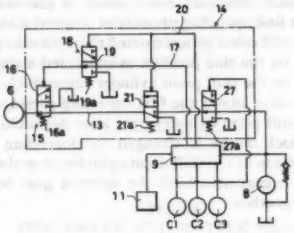
selector power means;

control means interconnecting said power means to said first and second actuator links for selectively causing movement of said first and second actuator links one at a time from their first positions to their second positions.

## 4,516,671
## CONTROL APPARATUS FOR A TORQUE CONVERTOR CLUTCH

**Masao Nishikawa, Tokyo; Takashi Aoki, Wako; Shinzo Sakai, and Hiroshi Yoshizawa, both of Kamifukuoka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 1, 1982, Ser. No. 383,610**
**Claims priority, application Japan, Jun. 1, 1981, 56-82520**
**Int. Cl.³ B60K *41/02***
**U.S. Cl. 192—.076** **6 Claims**




1. A control apparatus for a torque convertor clutch in a transmission, in a vehicle between an engine producing an output and a driving wheel, the transmission including a torque convertor having a pump, a turbine, and a clutch for mechanically interconnecting the pump to the turbine, said control apparatus comprising:

means for engaging the clutch,

release means for disabling the means for engaging when the engine output increases above a predetermined set output value thereby releasing the clutch, and

a release-preventing means operatively associated with said release means for preventing operation of said release means when the vehicle speed increases above a predetermined set speed value even though the engine output increases above the predetermined set output value;

said transmission further including engine output signal means for producing an output signal proportionate to engine the output, an oil pressure source, and vehicle speed signal means for producing a speed signal proportionate to vehicle speed; said means for engaging including an oil supply passage from said oil pressure source to said clutch, said clutch being engaged by oil pressure from said oil pressure source; said release means comprising a first control valve interposed in said oil supply passage having an open position in which oil pressure is supplied to said clutch and a closed position in which oil pressure is cut off from being supplied to said clutch, a first spring urging said first control valve towards said open position, and a first control line applying said output signal from said engine output signal means urging said first control valve towards said closed position, said first spring having sufficient spring force to hold said first control valve in said open position until said output signal from said engine output signal means reaches said predetermined set output value.

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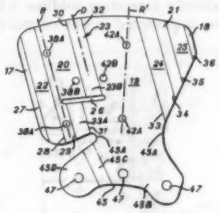
## 4,516,672
## PROGRESSIVE ENGAGEMENT FRICTION DISC

**André Caray, Paris, France, assignor to Valeo, Paris, France**

**Filed Aug. 3, 1982, Ser. No. 404,922**
**Claims priority, application France, Aug. 20, 1981, 81 16001**
**Int. Cl.³ F16D *13/68, 13/64***
**U.S. Cl. 192—107 C** **23 Claims**

1. A progressive engagement friction disc comprising a hub, at least one washer coupled to said hub, at least two friction linings fixed one on each side of blades disposed in a circular series and fastened to said at least one washer, each of said blades having plane areas divided into at least two sets for fixing the respective friction linings thereto, said plane areas extending at slightly different levels in two parallel planes, and ramp means connecting the plane areas of one of the sets to the plane areas of the other set through bend lines at the levels of the respective plane areas, at least one of the ramp means



comprising at least two radially extending parts offset from each other in a circumferential direction, and said offset parts of the said ramp means being separated from each other by a closed circumferentially extending slot disposed transversely to said at least one ramp means.

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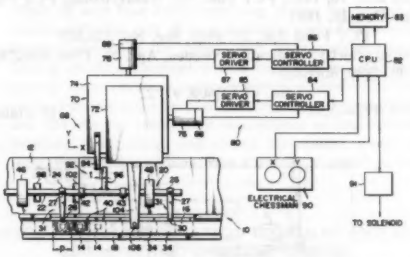
## 4,516,673
## APPARATUS FOR CONVEYING A LEAD FRAME MOUNTING SEMICONDUCTOR PELLETS

**Tomio Kashihara, Yokohama; Toshiro Tsuruta; Masayoshi Yamaguchi, both of Kawasaki; Kiyotachi Yokoi, Yokohama, and Etsuji Suzuki, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Sep. 29, 1982, Ser. No. 426,754**
**Claims priority, application Japan, Nov. 25, 1981, 56-188839**
**Int. Cl.³ B65G *43/00***
**U.S. Cl. 198—341** **14 Claims**




1. An apparatus for conveying a lead frame mounting semiconductor pellets comprising:

a guide path for guiding the lead frame;

a feed member movably disposed between an initial position and a forward position along the guide path and movably disposed between a first position where the feed member is separated from the lead frame and a second position where the feed member engages with the lead frame;

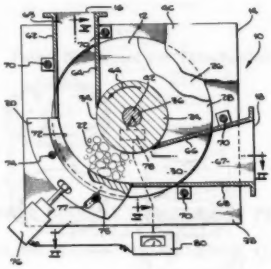
first driving means for moving the feed member from the first position to the second position; and

second driving means which is separate from the first driving means and includes an X-Y table for moving the feed member positioned in the second position from the initial position to the forward position, the X-Y table having a first drive motor for linearly driving the X-Y table along the guide path, whereby the lead frame is conveyed along the guide path by a predetermined distance.

## 4,516,674
## METHOD AND APPARATUS FOR CONVEYING AND METERING SOLID MATERIAL

Donald Firth, 2277 Mandeville Canyon, Los Angeles, Calif. 90049

Continuation of Ser. No. 284,560, Jul. 20, 1981, abandoned. This application Sep. 12, 1984, Ser. No. 649,736
Int. Cl.³ B65G 31/04
U.S. Cl. 198—617 5 Claims



5. A process for conveying solid material comprising the steps of:

feeding solid material to an inlet end of a passageway formed between a friction drive wall and a stationary wall, said friction drive wall having a greater surface area for contacting said solid material than said stationary wall;

moving said friction drive wall towards an outlet end of said passageway;

monitoring the torque needed to move said friction drive wall;

compacting said solid material within said passageway by converging said stationary drive wall with respect to said friction drive wall; and

varying the degree of convergence of said stationary wall with respect to said friction drive wall in response to changes in said torque.

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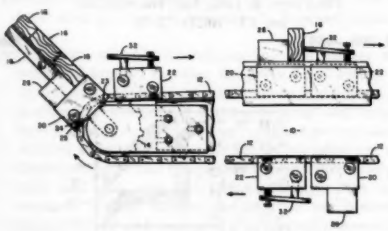
## 4,516,675
## CONVEYOR FEED MECHANISM

Jerome E. Koskovich, R.R. 2, Byron, Minn. 55920

Filed Jun. 1, 1982, Ser. No. 383,502
Int. Cl.³ B65G 47/74
U.S. Cl. 198—654 3 Claims



1. A conveyor feed and transport mechanism adapted for use with an endless conveyor, for supporting a workpiece in vertical registration and transporting same along a horizontal path of said conveyor, comprising

(a) a pair of parallel channel members longitudinally aligned adjacent respective sides of said endless conveyor, each of said channels comprising a pair of spaced apart horizontal planes adjacent said endless conveyor and a vertical edge positioned higher than said conveyor, said vertical edge having an inclined surface from a first conveyor entrant position to a second higher position, and a horizontal surface thereafter parallel to said horizontal planes;

(b) a pair of trucks attached to said endless conveyor and each truck having a first pair of wheels positioned for rolling against one of said spaced apart horizontal planes, and a second pair of wheels positioned for rolling against the other of said spaced apart horizontal planes, and each truck having an upper surface bridging said endless conveyor, said upper surface being lower than said vertical edge horizontal surface;

(c) a backrest member rotatably attached on the upper surface of one of said trucks and spring-biased detent means between said backrest member and said upper surface of said one of said trucks, for presetting said backrest member into either of two positions; and

(d) a clamp arm member attached to the other of said trucks, said clamp arm member being supported above the upper surface of said other of said trucks and projecting toward said backrest member, and spring means for biasing said clamp arm member toward said backrest member.

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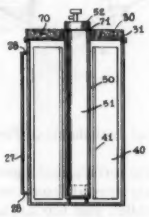
## 4,516,676
## HOUSEHOLD CLEANING KIT

Roger J. A. Cournoyer, 17200 Libby Rd., Maple Heights, Ohio 44137

Filed Dec. 27, 1983, Ser. No. 566,106
Int. Cl.³ B65D 83/14
U.S. Cl. 206—226 1 Claim



1. A household cleaning kit for use with a roll of paper wound upon a core, comprising:

a fluid spray applicator having an elongated tubular receptacle and activator and nozzle means fixed to said receptacle;

a cylindrical container body forming an interior space, and having an elongated dispenser slot formed through said body and communicating with said interior space, an elongated exterior severing strip fixed to said body and disposed parallel to, and spaced apart from, said slot, a U-shaped member fixed to said body between, and parallel to, said slot and said strip, and an open end communicating with said interior space, said applicator being received by said interior space to form a generally annular space, said applicator being aligned with said strip, slot and U-shaped member, said activator and nozzle means projecting through said open end;

cover means for sealing said container body attached over said open end aperture means being formed therethrough for allowing said activator and nozzle means to project beyond said cover means while retaining said applicator in said container body, said applicator being rotatable with respect to said cover means, aperture means and container body;

a sponge having a gripping aperture for receiving said activator and nozzle means, said sponge being secured to said activator and nozzle means but rotatable with respect thereto and removable therefrom; and

the roll being received in said generally annular space, said

tubular receptacle frictionally engaging the core whereby the roll and said tubular receptacle rotate together with respect to said container body, the paper being extendable through said slot and said U-shaped member and over said strip upon such rotation.

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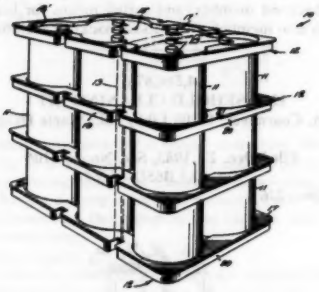
**4,516,677**

## MODULAR PALLET AND SHIPPING TRAY

**Nelson Rowland, Asheboro, and Robert D. Getto, Greensboro, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.**

**Filed Dec. 12, 1983, Ser. No. 560,501**
**Int. Cl.³ B65D *71/00***
**U.S. Cl. 206—394** **24 Claims**



1. A pallet formed of two sheets of fused, molded material, comprising:

a generally planar top surface, and a generally planar bottom surface sufficiently spaced from the said top surface to provide a rigid pallet, said top surface formed by one of said sheets and said bottom surface by the other of said sheets;

a pattern of nubs upstanding from said top surface, each nub surrounded by a recess in said top surface;

a pattern of depressions formed on said bottom surface, said pattern of depressions tracking said pattern of nubs upstanding from said top surface;

each of said nubs shaped and dimensioned to receive the inner surface of a first tube thereover, and provide maximum resilient surface contact with the inside of the first tube when a bottom portion of the tube is received in said recess surrounding said nub; and

each depression in said bottom surface dimensioned to receive another tube substantially indentical to said first tube therein.

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**4,516,678**

## FLOPPY DISK CANISTER

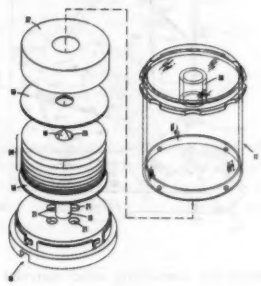
**Emanuel Fotiadis; Edward J. Kozol, both of Ft. Lauderdale; Tak L. Leung, Boca Raton, and Robert J. Paul, Lighthouse Point, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 27, 1983, Ser. No. 499,085**
**Int. Cl.³ B65D *85/57***
**U.S. Cl. 206—444** **19 Claims**

1. A canister for holding a stack of floppy magnetic recording disks, comprising:

a stack of floppy magnetic recording disks;

a base member having a flat surface which is larger than said disks supporting said disk stack by way of a centrally located, upwardly extending post which forms a right angle to said flat surface, the cross section of said post substantially conforming to the collet opening which is formed in the center of the disks, said post being of a length to extend beyond the top disk in the stack, and said base member's flat surface having a boundary portion including cover latch means;



a relatively deep cover having a rim including latch means adapted to cooperate with the latch means of said base member's boundary portion; and

compressible means located between the top disk of the stack and the internal top surface of said cover, and operable to be compressed as said cover is latched to said base member, to thereby provide a force which loads said disk stack so as to prevent relative movement between adjacent disks in said stack.

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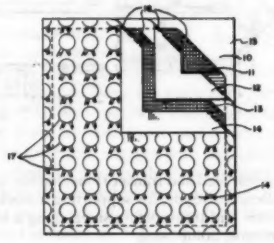
**4,516,679**

## TAMPER-PROOF WRAP

**Carolyn N. Simpson, 1946 E. 6400 South, Salt Lake City, Utah 84121, and John A. Perry, 1838 Wasatch Dr., Salt Lake City, Utah 84104**

**Filed Nov. 4, 1982, Ser. No. 439,303**
**Int. Cl.³ B65D *73/00***
**U.S. Cl. 206—459** **27 Claims**



1. A tamper-proof wrap for encasing a consumer product for shelf display comprising, interior and exterior sheets of a thin

plastic material positoned over one another and bonded together around the outer edge and including a layer of a select chemical sealed therebetween such that on puncture of a wrap exterior sheet, a chemical response will occur that will produce a visual indication at the wrap puncture; and distinctive seal means fixed at spaced intervals over said wrap exterior sheet.

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**4,516,680**

**Patent Not Issued For This Number**

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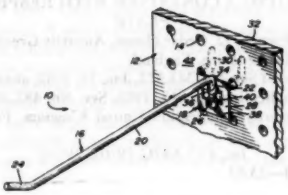
**4,516,681**

## COLLAPSIBLE DISPLAY HANGER FOR PERFORATED DISPLAY PANELS

**Alfred Jahel, 500 Deguire, Ville St-Laurent, Quebec, Canada H4L 1L2**

**Filed Apr. 5, 1982, Ser. No. 365,233**
**Int. Cl.³ A47F 5/13**
**U.S. Cl. 211—59.1** **15 Claims**



1. A collapsible display hanger for detachable engagement with a perforated display panel provided with regularly spaced perforations arranged in horizontal and vertical rows, comprising:

a hanger member having an elongate hanger arm adapted to extend outwardly from said panel and substantially perpendicular to the plane thereof, in a normal merchandise display position;

a bracket member adapted to be removably anchored to said panel through a pair of horizontally disposed perforations; and

hinge means slidably interconnecting said hanger member with said bracket member for pivotal movement of said hanger arm about a pivot axis between said normal display position and a collapsed position whereat said hanger arm lies closely adjacent said panel, said hanger member being slidably engaged with said bracket member for shifting displacement of said hanger member in a direction parallel with said pivot axis such that said hanger arm clears an adjacent display hanger disposed in the pivotal path thereof when said hanger arm is pivotally moved to said collapsed position, said hanger member and said bracket member cooperating together upon disengagement of said bracket member from said panel to provide an articulation of said bracket member about a horizontal axis such that said bracket member is released from said panel in an arcuate movement when said hanger arm is pulled away from said panel while being maintained substantially perpendicular to the plane thereof, said hanger member including means which cooperates with said bracket member for retaining said hanger member and said bracket member in engagement with one another upon release of said bracket member from said panel, while permitting said shifting displacement of said hanger member.

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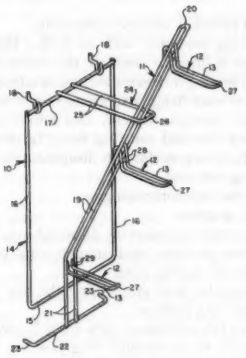
**4,516,682**

## MERCHANDISE DISPLAY RACK

**Ted A. Bell, Coshocton, Ohio, assignor to Pretty Products, Inc., Coshocton, Ohio**

**Filed Apr. 26, 1983, Ser. No. 488,775**
**Int. Cl.³ A47F 5/01**
**U.S. Cl. 211—59.1** **8 Claims**



1. A merchandise display rack for vertically suspending articles of predetermined vertical extent from their upper end portions in a plurality of vertically displaced tiers comprising

a support standard having means for cooperatively engaging with base support means to maintain said standard in an upright position, including a vertically disposed planar base frame adapted to be positioned against a vertical support surface of base support means for thereby stabilizing said support standard, said support standard having a support element projecting upwardly from a bottom end portion in forwardly inclined relationship toward the direction of viewing of merchandise carried in the rack, and

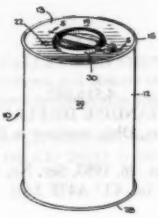
a plurality of merchandise support brackets mounted on said support element in relatively spaced relationship to support articles of merchandise in a plurality of vertically displaced tiers, each of said brackets including a leg for suspension of articles therefrom disposed substantially horizontal in forwardly projecting relationship to said support element and adapted to cooperatively engage with articles in suspension of the articles therefrom, each of said brackets being vertically spaced relative to a next adjacent bracket a distance less than the vertical height of the articles suspened therefrom whereby lowermost portions of articles suspended from one bracket will depend in front of the next lower bracket leg in overlapping relationship to upper portions of articles suspended from said next lower bracket, but which vertical spacing of next adjacent brackets leaves a bottom portion of articles on the next lower bracket exposed to visual observation from the front of the display rack.

**4,516,683**

## CHILD-RESISTANT CLOSURE

**Anthony Delia, West Redding, Conn., assignor to The Drackett Company, Cincinnati, Ohio**

**Filed Apr. 23, 1984, Ser. No. 602,880**
**Int. Cl.³ B65D** *55/02, 85/56;* **A61J** *1/00*
**U.S. Cl. 215—211** **28 Claims**



1. A child-resistant closure comprising:

(a) a can ring provided with an orifice through which the container is filled or emptied, the orifice having a peripheral rim having a downwardly extending flange, a minor portion of said flange extending below the lower edge of the major portion thereof, said minor portion being an unlocking tab, said can ring being further provided with indicia in its top surface to designate the location of said unlocking tab, and

(b) a cap, the cap comprising:

(i) a disc portion;

(ii) an annular ring portion disposed in a plane parallel to said disc portion, said annular ring portion having a peripheral sealing skirt;

(iii) an annular wall connecting the disc portion and the annular ring portion;

(iv) a pull tab extending outwardly horizontally from the periphery of the annular ring portion;

(v) an annular retaining flange extending through the periphery of the disc portion; and

(vi) a first protrusion extending outwardly horizontally from said annular retaining flange, the protrusion being proximate to and in alignment with the pull tab; the cap being adapted for snap fit retention within the can ring orifice,

whereby the cap is removed from the orifice by rotating the cap such that the pull tab is in alignment with the indicia, the protrusion thereby being compressed and deflected downwardly by the unlocking tab, and applying a pull force to the pull tab.

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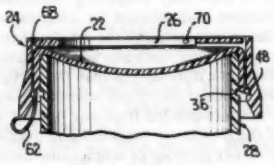
**4,516,684**

## RESEALABLE CLOSURE

**John Walter, Evergreen Park, Ill., assignor to Continental Packaging Company, Inc., Stamford, Conn.**

**Filed Apr. 10, 1984, Ser. No. 598,765**
**Int. Cl.³ B65D** *45/32*
**U.S. Cl. 215—272** **13 Claims**




1. A resealable closure for a container having a tubular neck having an external neck finish including a free end and a peripheral groove in an external surface thereof axially spaced from the free end: said closure comprising a closure element including an end panel for sealingly engaging a container, a skirt depending from said end panel, and locking means depending from said skirt, said locking means in an as formed state projecting radially outwardly from and beyond said skirt; a retaining sleeve hingedly connected to said closure element, said retaining sleeve having an internal surface of a size and shape substantially corresponding to the size and shape of the exterior surface of said skirt and forming means for radially inwardly deflecting said locking means into a container peripheral groove for locking said closure element onto a container, said retaining sleeve having formed in said internal surface thereof a locking groove for receiving radially outer portions of said locking means to lock said retaining sleeve on said closure element, and the relationship of said locking means, said locking groove and said retaining sleeve being one wherein said locking sleeve may be removed from the closure element as a unit and replaced.

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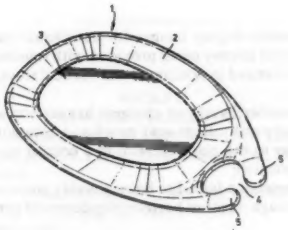
**4,516,685**

## SUPPORTING A CONTAINER WITH RESPECT TO A PLATE

**Michael J. French, 12, Cedar House, Ancastle Green, Henley on Thames, Oxfordshire, England**

**Continuation of Ser. No. 341,522, Jan. 21, 1982, abandoned. This application Apr. 13, 1983, Ser. No. 483,205**
**Claims priority, application United Kingdom, Feb. 2, 1981, 8103097**
**Int. Cl.³ A47G** *19/03, 19/06*
**U.S. Cl. 220—23.83** **7 Claims**




1. A plate for supporting food and a container provided with a stem or waist connected to a bowl portion, said plate comprising:

a first portion having an upper surface for supporting the food and a lower surface, said lower surface constituting the lowest level of said plate when said plate is in the horizontal position; and

a rim connected to said first portion and forming the periphery of said plate, said rim including a second portion provided with an aperture and defining a slot through the periphery of said rim which joins said aperture, said slot being shaped for passing the stem or waist of the container through the periphery of said plate into said aperture, said second portion sloping upwardly away from said first portion to stably support the bowl portion of the container, so that the container does not tend to slide out from the aperture through the slot when the plate is tilted from the horizontal.

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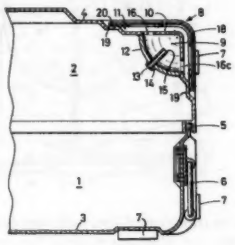
## PRESSURE BALANCING DEVICE WHICH IS WATERTIGHT AS CONCERNS RAINWATER OR TRICKLING WATER, IN PARTICULAR FOR A TRANSPORTING CONTAINER

Jacques E. C. Chaussepied, Saint Medard en Jalles, France, assignor to Societe Nationale Industrielle Aerospatiale, France

Filed May 21, 1984, Ser. No. 612,605
Claims priority, application France, May 20, 1983, 83 08364
Int. Cl.[3] B65B *3/04;* B65D *51/16*
U.S. Cl. 220—85 R 16 Claims




16. An enclosure in combination with a pressure balancing device which is watertight as concerns rainwater or trickling water, said device comprising a chamber having an outer wall and an inner wall, which inner wall separates said chamber from the interior of said enclosure, at least one orifice in said outer wall for putting said chamber in communication with the exterior, a tube extending through said inner wall and projecting into said chamber for putting the interior of said chamber in communication with the interior of said enclosure, said inner wall having such shape and said orifice having such position that, in any position of said enclosure, at least a part of said orifice is located at a level lower than a level of the end of said tube in said chamber.

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4,516,687

## HANDLE FOR A VESSEL

Haruyoshi Taguchi, Osaka; Hideo Tsujimura, Kyoto, and Masamichi Imanishi, Ikoma, all of Japan, assignors to Suntory Limited, Osaka, Japan

Filed Dec. 7, 1982, Ser. No. 447,690
Claims priority, application Japan, Jan. 5, 1982, 57-436[U]; Jan. 18, 1982, 57-6619; Jan. 26, 1982, 57-11278
Int. Cl.[3] B65D *23/10*
U.S. Cl. 220—94 R 21 Claims

1. A vessel with a handle, comprising:

a vessel having a side wall; and upper and lower spaced apart mounts on the upper and lower portions of said side wall, respectively, each of said upper and lower mounts being generally U-shaped and having a pair of transversely spaced opposite arms extending from said side wall of said vessel and a comparatively long cross member extending therebetween such that each of said upper and lower mounts is in the shape of a short-armed letter U and defines an opening of given length between the respective mount and the side wall of the vessel, the upper mount defining an opening of greater length between its opposite arms than said lower mount; and

a generally tabular, flexible elongated handle made of synthetic resin and adapted to be attached to said vessel by passing through and engaging both of said upper and lower mounts, said handle having a greater longitudinal length than the distance between an upper edge of said upper mount and a lower edge of said lower mount, said handle comprising first disengagement preventing means for preventing the upper end of said handle from downwardly slipping out of said upper mount and second disengagement preventing means passable through both said upper and lower mounts in said downward direction and for preventing the lower end of said handle from upwardly slipping out of said lower mount, said upper mount having upper and lower edges;

said first disengagement preventing means for preventing the upper end of said handle from downwardly slipping out of said upper mount comprising a pair of barbs which project sideways from the upper end of said handle and point in the downward direction of said handle, for engaging upper edges of said transversely spaced opposite arms of said upper mount;

said barbs having free end portions, and projections on said free end portions which project inwardly toward said handle to engage lower edges of said transversely spaced opposite arms of said upper mount to prevent disengagement of said barbs from said upper mount and preventing said upper end of said handle from upwardly slipping out of engagement with said upper mount; and

said handle having an upper portion and a lower portion, said upper portion having a width greater than that of said lower portion such that said lower portion is passable through the openings defined by both said upper and lower mounts and said upper portion is passable only through the opening defined by said upper mount.

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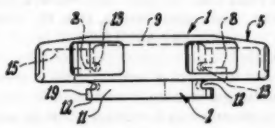
4,516,688

## CLOSURE CAP HAVING INTEGRATED FASTENING MEANS

Warwick P. Freeland, Mount Waverley, Australia, assignor to W. A. Deutsher Proprietary Limited, Moorabbin, Australia

Filed Feb. 27, 1984, Ser. No. 583,568
Int. Cl.[3] B65D *41/06*
U.S. Cl. 220—293 12 Claims




1. A one-piece plastics material closure cap for closing an opening in a hollow receptacle or container including, a cylindrical body section which is insertable into said opening, an enlarged head section at one end of the body section and formed integral therewith, a plurality of locking lugs provided on said body section in circumferentially spaced relationship and each projecting radially outwards from said body section, resilient means connecting each said locking lug to said body section aand being formed integral with both said body section and the respective said lug, said resilient means allowing movement of the respective said locking lug relative to said body section in the axial direction of said body section, and stop means limiting the extent of said relative movement so as to prevent over-stressing of said resilient means.

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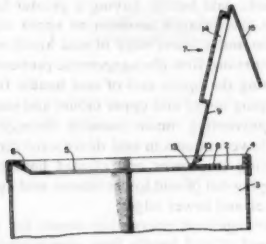
## EASY OPEN/RECLOSABLE CONTAINER WITH POURING LIP AND HOLD-OPEN FEATURE

**Dale E. Barker, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 22, 1984, Ser. No. 623,792**
**Int. Cl.³ B65D *51/22***
**U.S. Cl. 220—335** **11 Claims**



1. An easy-open, reclosable container comprising:

(a) a hollow body portion having an uppermost and lowermost edge, said lowermost edge having a bottom end panel attached thereto;

(b) a top lid attached to said uppermost edge of said body portion, said top lid having a discrete dispensing aperture therein and an upwardly-projecting, peripheral rim;

(c) a pouring lip integrally formed within said top lid between said dispensing aperture and said peripheral rim;

(d) a closure element having a movable portion, a fixed portion, and an over-center hinge, said movable portion having a downwardly-projecting plug that is shaped complementary to said dispensing aperture whereby said aperture will readily receive said plug, said fixed portion being attached to said top lid adjacent to said dispensing aperture; and

(e) means for releasably securing said plug within said dispensing aperture.

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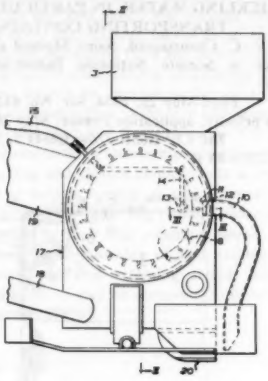
## APPARATUS FOR PLANTING SEEDS IN DRILLS AT PREDETERMINED INTERVALS

**Alf H. Andersson, Box 23, Ödåkra, Sweden**

**PCT No. PCT/SE81/00380, § 371 Date Aug. 10, 1982, § 102(e) Date Aug. 10, 1982, PCT Pub. No. WO82/02142, PCT Pub. Date Jul. 8, 1982**
**PCT Filed Dec. 18, 1981, Ser. No. 414,346**
**Claims priority, application Sweden, Dec. 19, 1980, 8008973**
**Int. Cl.³ A01C *7/04***
**U.S. Cl. 221—233** **1 Claim**

1. An apparatus for planting seeds in drills at predetermined intervals, comprising a housing, a seed store in said housing, a wheel rotatably mounted in a vertical plane in said housing, said wheel having a plurality of spoons fixed in succession along the periphery of the wheel and disposed to pass through said seed store and to move upwardly therefrom, each spoon having a concave surface configured and oriented to pick up one seed from said seed store as the spoon moves through the seed store with said surface facing substantially outwardly away from one side of the wheel and to lift the seed to a position at said one side of the wheel, at which said surface faces substantially upwardly, with the seed supported on the surface by gravity, an outlet duct having an inlet portion in said housing at said position, and means including a nozzle connected to a source of compressed air and disposed opposite to and spaced from said inlet portion for providing a jet of compressed air directed toward said inlet portion, said wheel being disposed relative to said nozzle and said inlet portion such that each spoon moves upwardly into the space between said nozzle and said inlet portion at said position for causing the seed supported



on the spoon to be transported into said inlet portion by said jet of compressed air.

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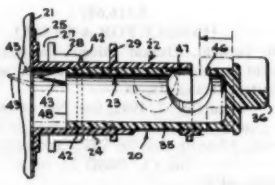
## PIERCE TURN TAP

**William C. Christine, Catasauqua, Pa., and Charles H. Trillich, Long Valley, N.J., assignors to Trinity Foundation, Nazareth, Pa.**

**Filed Jan. 25, 1982, Ser. No. 342,660**
**Int. Cl.³ B67B *7/24***
**U.S. Cl. 222—83.5** **7 Claims**



7. A two piece plastic turn tap consisting of two parts, one of said parts comprising a body member including a sleeve having a flange for attachment to a pouch, a rim on said sleeve spaced from said flange, said flange and rim co-acting to provide a space for receiving a portion of a box container, and wherein there is provided a locking means that includes members extending transversely from the rim to receive tabs of a box container to prevent rotation of the tap relative to the box container, an inner piercer member including a sharp pointed portion, said piercer member being made of relatively soft material, a flange portion mounted on the sleeve providing a convenient hand grip to facilitate manual manipulation of the tap, there being an aperture in said sleeve, a keeper disposed inwardly on the sleeve, there being an annular groove in said piercer member for selective engagement by said keeper, said piercer member having an aperture for selective registry with the aperture in the sleeve, a handle on said piercer member, and inter-engaging stop elements on said piercer element and sleeve for selectively limiting movement of the piercer member.

**4,516,692**

## DISPOSABLE CONTAINER ASSEMBLY FOR LIQUIDS OR SEMI-LIQUIDS IN BULK

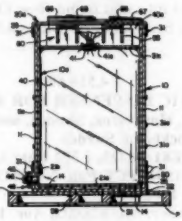
**Thomas E. Croley, Worthington, Ohio, assignor to Williamette Industries, Inc., Delaware, Ohio**

**Continuation-in-part of Ser. No. 349,696, Feb. 17, 1982, Pat. No. 4,421,253. This application Feb. 28, 1983, Ser. No. 470,274**

**The portion of the term of this patent subsequent to Dec. 20, 2000, has been disclaimed.**

**Int. Cl.³ B65D** *35/14*

**U.S. Cl. 222—105** **20 Claims**



1. A container and support assembly including:

a disposable fiberboard assembly comprising a tubular body of fiberboard or the like composed of a plurality of vertical panels hinged together at vertical hinge joints to form a multi-sided polygonal body of tubular form open at both its upper and lower ends which is set up from a blank folded flat at opposed hinge joints, a bottom tray of fiberboard or the like with upstanding flanges hinged to a flat disc-like bottom wall which has an outer polygonal periphery corresponding substantially to that of the tubular body and with flanges hinged thereto at horizontal hinge joints and being set-up from a flat blank with the flanges turned upwardly from the disc-like bottom, at least one surrounding tie-band securing the flanges in upstanding position, said tubular body being telescoped downwardly into the tray with its vertical panels within the corresponding upstanding flanges of the bottom tray and having its lower end resting on the bottom disc-like wall of the tray, a pallet on which said tray disc-like bottom wall rests, a cap of fiberboard or the like with depending flanges hinged to a disc-like top wall which has an outer-polygonal periphery corresponding substantially to that of the tubular body and with flanges hinged thereto at horizontal hinge joints and being set-up from a flat blank with the flanges turned downwardly, at least one surrounding tie-band securing the flanges in depending position, said cap being telescoped downwardly over the upper end of the tubular body with its depending flanges overlapping the corresponding vertical panels of the body and with its disc-like top wall resting on the upper end of the body; and stabilizing means for securing the fiberboard assembly to the pallet comprising tension members at angularly-spaced positions around the tubular fiberboard container body extending completely vertically around the cap and along the vertical panels of the body and tightened and secured to the pallet to clamp these members axially together; said body having a flexible bag therein filled with contents to a level spaced below the disc-like top wall of the cap and a spacer unit between that cap wall and the upper end of the filled bag to apply pressure thereto, said tubular body having flanges at its lower end hinged to the corresponding panels at horizontal hinge joints and turned inwardly horizontally so they will rest on said disc-like bottom wall of the tray, said assembly including a liner disc having an outer polygonal edge complemental to the polygonal shape of the body and inerted axially therein to rest on said horizontal flanges, and a tubular body liner of a polygonal shape like the body set up from a similar flat blank composed of a corresponding number of hinged panels which are disposed in flat contact with the inner surfaces of the corresponding body panels, said liner having a lower edge resting on the liner disc and an upper edge engaging the top disc-like wall of the cap; and a pressure-applying disc in engagement with the upper end of the filled bag and engaged by said spacer unit, said disc having an outer polygonal edge complemental to the liner in which it is inserted, said stabilizing means including an upper stabilizing frame in contact with the flat disc-like top wall of the cap, said frame including frame members disposed in angular relationship across said flat top wall of the cap to provide outwardly-extending arms which extend to the edge of the cap, said pallet being of a size to extend to the edge of the tray, said pallet having an upper support surface and spaces therebeneath, said tension members extending vertically completely around the stabilizing frame along the arms thereof and beneath the support surface of the pallet and through the said spaces thereof.

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**4,516,693**

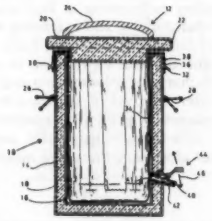
## SANITARY DRINKING WATER SYSTEM

**Roy T. Gaston, Rte. 2, Box 483-H, Pell City, Ala. 35125**

**Filed Sep. 6, 1983, Ser. No. 529,384**

**Int. Cl.³ B65D** *25/16, 25/42*

**U.S. Cl. 222—105** **3 Claims**



1. A sanitary drinking water system for construction sites and the like, which comprises:

a barrel having an open top end and a closed bottom end and a cylindrical wall defining a cylindrical cavity, said barrel being provided with an opening through said wall adjacent said closed end, said opening defining an extended surface;

a removable lid for said open end of said barrel;

a plurality of hooks projecting outwardly from said barrel proximate said open end;

a replaceable flexible liner disposed within said cavity, said liner having a closed end disposed adjacent said closed end of said barrel and an open end extending from said open end of said barrel, said open end of said liner being provided with reinforced apertures releasably engaged with said hooks;

a spout attached to and communicating with said liner disposed adjacent said closed end of said liner and disposed within said opening in said wall of said barrel; and

a pinch valve mounted on the external surface of said barrel proximate said opening for normally closing said spout against any flow from said liner, said valve including a lever pivoted from said barrel wall, said lever carrying a cylindrical cut off bar to deform said spout against said extended surface upon action of gravity, and for permitting flow from said liner upon upward movement of said lever.

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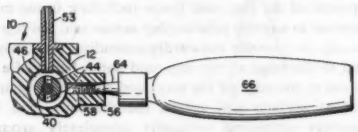
## SOLVENT FLUSHING ARRANGEMENT FOR FOAM DISPENSING GUN

**Clifford J. Finn, Wauwatosa, Wis., assignor to Universal Foam Systems, Inc., Cudahy, Wis.**

**Filed Aug. 8, 1983, Ser. No. 521,420**
**Int. Cl.³ B67D *1/08***
**U.S. Cl. 222—148** **4 Claims**




1. In a foam dispensing kit comprising a pair of pressurized tanks respectively containing an A resin and a B resin, said A resin being settable on exposure to air, a container of A resin solvent having a solvent discharging tip and means for dispensing said solvent through said discharging tip under pressure, and a dispensing gun having a body to establish a pair of internal resin passageways in separate fluid flow communication with said tanks, respectively, a removable mixing nozzle to receive and mix said A resin and said B resin and to discharge the mixed resins as foam, and separate valves in each of said internal resin passageways, each of said valves having a seat and means engageable with said seat to close said passageways upstream from an internal gun passageway portion, the improvement comprising:

means defining a solvent flushing port in said gun body, said port providing an opening in said body to receive said solvent discharging tip and extending to the internal gun passageway for said A resin at a point downstream from and adjacent to said valve seat in such passageway, whereby discharge of solvent from said container through said port after removal of said nozzle flushes only said internal passageway portion to remove residual amounts of said A resin remaining in said internal passageway portion after closure of the valve means therein.

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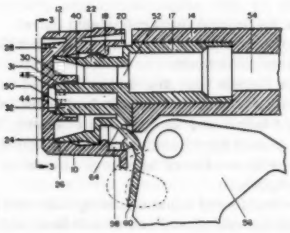
**4,516,695**

## CHILD-RESISTANT LIQUID DISPENSER SPRAYER OR LIKE APPARATUS

**Richard P. Garneau, Davie, Fla., assignor to The AFA Corporation, Hialeah, Fla.**

**Filed Feb. 9, 1981, Ser. No. 232,782**
**Int. Cl.³ B05B *1/12***
**U.S. Cl. 222—153** **13 Claims**




13. A child-resistant adjustable nozzle for a hand-operated liquid ejection apparatus, said apparatus including a discharge end which has an upper side and a lower side, insertable means having an upper side and a lower side in said discharge end for coupling said nozzle to said apparatus, said nozzle being movable into different positions relative to said insertable means including a liquid flow OFF position for said apparatus, passage means in said nozzle and on said insertable means in said discharge end adapted to form passageways for liquid conducted to said discharge end for ejection from said nozzle, which passageways are formed when said passage means are brought into register by adjustment of said nozzle relative to said insertable means and thereby determine the ejection or discharge mode of said apparatus, deflection means on the lower side of one of said nozzle and said insertable means and cooperating engagement means on the lower side of the other of said nozzle and insertable means adapted to engage said deflection means and lock said nozzle in child-resistant relationship with said apparatus when said nozzle and insertable means are moved into said liquid flow OFF position and said deflection means being integral with said insertable means.

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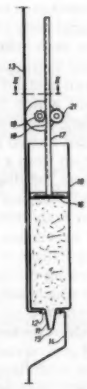
**4,516,696**

## AUTOMATIC DISPENSER FOR A DETERGENT

**Per O. E. Eknor, Huskvarna, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden**

**PCT No. PCT/SE81/00225, § 371 Date Apr. 16, 1982, § 102(e) Date Apr. 16, 1982, PCT Pub. No. WO82/00753, PCT Pub. Date Mar. 18, 1982**
**Continuation of Ser. No. 375,031, Apr. 16, 1982, abandoned.**
**This PCT application Aug. 10, 1981, Ser. No. 578,988**
**Claims priority, application Sweden, Aug. 28, 1980, 8006035**
**Int. Cl.³ B67D *5/06***
**U.S. Cl. 222—181** **4 Claims**

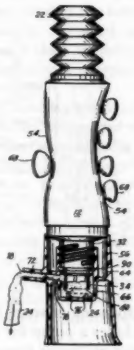


1. A device mounted on a wall adjacent a wet cabinet of a laundry or dishwashing machine for automatic apportioning and dispensing of a detergent in the form of a paste to the wet cabinet, comprising a container having a discharge hole and provided with a supply of said paste, and apportioning and dispensing means for transferring a portion of said paste from said container through said discharge hole to said wet cabinet of the machine, said apportioning and dispensing means further comprising a piston provided with a rod inserted in said container, a motor and movement transmitting means, said rod being connected to said motor through said transmitting means, said piston rod further being provided with teeth engaging with a part of said movement transmitting means in the form of a drive wheel, a support idle wheel engaging the piston rod on the side opposite the toothed side wherein means are provided for pivotally mounting the support idle wheel to be moved into and out of engagement with said piston rod, a locking device being provided for releasably locking said support idle wheel in a position of engagement with said piston rod, said support idle wheel mounting means being operable to move said wheel to a position permitting the removal of said container and piston together with the piston rod from said wall.

## 4,516,697
## LIQUID PRODUCT DISPENSER

James R. Dreps, Kinnelon, and Edward J. Drozd, Lake Hiawatha, both of N.J., assignors to Captive Plastics Inc., Piscataway, N.J.

Filed Sep. 22, 1982, Ser. No. 421,545
Int. Cl.³ B65D 37/
U.S. Cl. 222—212 8 Claims



1. A hand dispenser for a liquid, in combination, comprising:
a base,
a closed container mounted on said base for storing said liquid, said container having a discharge port, said container being vertically movable between a first lowered position and a second raised position, said discharge port being closed in said first position and open in said second position,
passage means for discharging said liquid contained in said container to the atmosphere, said passage means being connected to said discharge port at one end and having a dispensing orifice at the other end, said dispensing orifice being positioned outside of said dispenser,
means for manually ejecting a portion of said liquid from said container into said passage means and to the atmosphere,
means for lowering the liquid level in said container and creating a lower pressure in said container above the liquid level than exists in the atmosphere after the ejection of said portion of said liquid,
whereby when the portion of the liquid is ejected from teh dispenser, atmospheric pressure prevents the remaining liquid in the container and in the passage means from passing to the atmosphere,
said hand dispenser further including a cylinder mounted to said base, said cylinder forming a closed chamber having an open side disposed beneath and forming a liquid passage with said discharge port, said cylinder being capable of receiving the bottom portion of the container,
thread means formed by the chamber and the container for allowing rotation and raising and lowering of the container in said chamber between said first and second positions, the thread means forming a substantially sealed interconnection between said cylinder and said container,
a neck member connected to the bottom of said container, said neck member forming a connecting passage between said container and said chamber, said neck member being smaller in cross-sectional area than the bottom of said container, said thread means forming by said container being mounted on said neck member,
said discharge port including a peripheral edge disposed at the bottom portion of said neck member, said cylinder including a bottom wall, said peripheral edge being in substantially sealed alignment with said bottom wall when said container is in said first position, and being removed from said bottom wall when said container is in said second position,
a raised ring portion connected to said bottom wall of said cylinder, said raised ring portion being capable of being in sealing alignment with the inner surface of said neck when said container is in said first position, whereby said discharge port is sealed around the periphery of the port in the first position,
a duct extension member disposed at the bottom of said neck member, said discharge port being positioned at the bottom of said duct member, said duct member having a smaller cross-sectional area than said container,
said discharge port being disposed at the bottom of said duct member, said discharge port being formed by edge portions of the bottom of said duct member,
and a discharge spout connected to said cylinder chamber and extending through said base, said spout including said dispensing orifice and an opposed inner orifice positioned in the side wall of said chamber and spaced above the bottom wall of said chamber.

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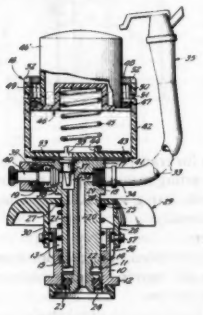
## 4,516,698
## KEG-PUMP CONSTRUCTION

Vincent J. Cerrato, Camarillo, Calif., assignor to Vending Components, Inc., Hackensack, N.J.

Filed Feb. 2, 1983, Ser. No. 463,135
Int. Cl.³ B67D 5/42
U.S. Cl. 222—341 8 Claims



1. A keg-pump assembly for removable attachment to a keg for pressurized delivery of beer or other beverage within the keg, comprising a generally annular body having a keg-engageable flanged lower end and a cylindrical bore extending upwardly from said lower end, an elongate probe having a cylindrical lower portion in longitudinally and rotatably displaceable sealed relation to said bore and extending upward beyond the upper end of said body, said probe having a first internal passage communicating between the lower end of the probe and an outwardly directed beverage-dispensing port at a location above said body, said probe having a second internal passage communicating between the upper end of the probe and open at the lower end of the probe at a location offset from the lower end of the first passage, reciprocable manual air-pump means carried by the upper end of said probe for directional delivery of pressurized air down the second passage, radially outward shoulder means on said probe at a location between said beverage-dispensing port and the upper end of said body, compressionally loaded spring means reacting between said body and said shoulder means to urge said probe upwardly with respect to said body, and a handle including an annular hub circumferentially encompassing and rotatably engaged to said shoulder means and in axial overlap with the upper end of said body, said body and handle having in their region of overlap coacting cam and follower formations determining axial compression of said spring in the course of rela-

tive rotation of said handle and body from a fixedly limited upper position of said handle to a lower handle position of greatest spring compression and of maximum downward displacement of the lower end of said probe beyond the lower end of said body.

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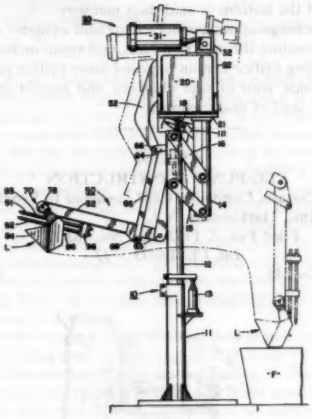
**4,516,699**

## AUTOMATIC LADLING APPARATUS

**Charles A. Burton, and Peter Banovic, both of Columbus, Ohio, assignors to Yellowstone Ltd., Columbus, Ohio**

**Filed Jun. 10, 1983, Ser. No. 503,164**
**Int. Cl.³ B22D *41/12***
**U.S. Cl. 222—591** **17 Claims**



1. Apparatus for transporting a charge of molten metal from a furnace to a casting means and for pouring said charge into a receiver for said casting means, comprising:

a support assembly;

a ladle dipper;

a crankshaft journaled in said support assembly;

drive means for turning said crankshaft in forward and reverse directions;

a crank arm fixed to said crankshaft;

a generating arm pivotally connected at one end to said crank arm;

link means operatively connected between said generating arm and said support assembly whereby the other end of said generating arm defines a predetermined motion path in response to turning of said crank arm;

a main link connected at one end to said support assembly for pivotal movement about a main axis parallel to the axis of said crankshaft;

a carrier link pivotally connected at its inner end to the other end of said main link and adapted to support said ladle dipper at its outer end for pivotal movement relative thereto about a tilt axis parallel to said main axis;

means operatively connecting said other end of said generating arm to both said main link and said carrier link whereby in response to movement of said generating arm said main link and said carrier link are operable to transport said ladle dipper in forward and reverse directions through a controlled path of travel between a fill position wherein said ladle dipper is lowered into a furnace reservoir to receive a charge of molten metal and wherein said carrier link is generally vertical, and a pour position wherein said ladle dipper is over said receiver for said casting means and wherein said carrier link is generally horizontal; and

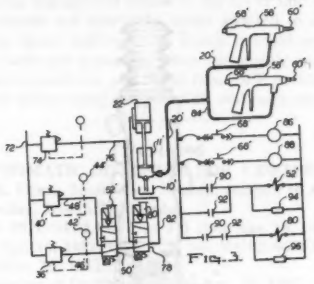
means for controlling the attitude of said ladle dipper relative to said tilt axis.

**4,516,700**

## HOT MELT ANTI-SURGE DISPENSING SYSTEM

**Raymond J. Guzowski, New Hudson, Mich., assignor to Pyles Division, Wixom, Mich.**

**Filed Mar. 31, 1982, Ser. No. 363,943**
**Int. Cl.³ B67D *5/46***
**U.S. Cl. 222—330** **7 Claims**



1. An anti-surge dispensing system for viscous materials wherein the system includes a pump for the material operated by an expansible chamber air motor powered by a compressed air source and a valved dispensing nozzle in communication with the pump, the improvement comprising air pressure control means interposed between the air motor and compressed air source controlling the air pressure supplied to the air motor in accordance with the condition of the valve of the dispensing nozzle, said air pressure control means including a first air pressure regulator having a low air pressure output, a second air pressure regulator having an air pressure output higher than that of said first regulator, electrically operated valve means communicating with said regulators and the air motor having a first position supplying low pressure air to the air motor and a second position supplying higher pressure air to the air motor, and an electric switch simultaneouly operated with the valve of the dispensing nozzle controlling the position of said valve means whereby a low air pressure is supplied to the air motor when the dispensing nozzle valve is closed and a higher air pressure is supplied to the air motor when the dispensing nozzle valve is opened.

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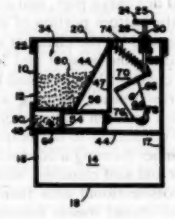
**4,516,701**

## DISPENSER FOR PARTICULATE MATERIAL IN MEASURED QUANTITIES

**Terry B. Tribble, Roberta, Ga. 31078**

**Continuation of Ser. No. 310,608, Oct. 13, 1981, abandoned. This application Feb. 8, 1984, Ser. No. 578,292**
**Int. Cl.³ G01F *11/10***
**U.S. Cl. 222—361** **1 Claim**



1. In a dispensing device for particulate material:

a three-dimensional housing comprising a storage hopper for storing and dispensing the particulate material, said hopper having a sloped interior and a dispensing outlet

therein from which the particulate material may exit by gravity for dispensing a measured amount,

a receptacle mounted for movement to reciprocate in straight extension and retraction beneath said hopper to receive a quantity of particulate material therein, said receptable having an open top to receive the material therein from said hopper outlet and an open bottom to dispense the material therefrom,

a removable closure on said housing having a hole therein,

means on said housing closing the bottom of said receptacle while in substantially retracted position beneath said hopper comprising a shelf member within said housing providing a bottom for said receptacle when in retracted, non-dispensing position,

control means in said housing and rearwardly of said receptacle having a pivoting means and a means engaging said pivoting means with said receptacle, a plunger mounted in the hole in said closure, said plunger being movable vertically and having an unattached terminal contact and whereby said closure may be removed with said plunger therein without detaching said plunger, said pivoting means including a first portion contacted by and free of the unattached terminal end of said plunger and a shifting means comprising a portion depending therefrom for driving said receptacle in response to movement of said plunger to drive from a non-dispensing to a dispensing position,

spaced first and second supports for said pivoting means,

spring means normally biasing said receptacle to retracted position, said spring means resisting the movement of said pivoting means by said plunger and tending to return said receptacle to retracted position,

said means engaging comprising a connecting means for engaging said second portion of said pivoting means with said receptacle.

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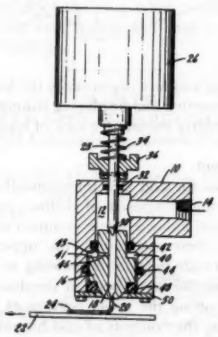
**4,516,702**

## DRIPLESS VALVE

**Robert W. Schmidt, Oak Lawn, Ill., assignor to Copar Corporation, Oak Lawn, Ill.**

**Filed Dec. 6, 1982, Ser. No. 447,154**
**Int. Cl.³ B05B *1/28***
**U.S. Cl. 222—514** **5 Claims**



1. A valve for applying a flowable material in which it is desired to provide a sharp cutoff in application of the material including:

a valve body and a chamber therein, said chamber being in communication with a source of the material to be applied,

a movable piston positioned within said valve body, a passage in said piston opening to said chamber, said passage terminating in an application opening,

a movable valve stem positioned to open and close upon said passage chamber opening to control the flow of material to said passage and application opening,

and means for creating a negative pressure at said application opening at or immediately after closure of said valve stem upon said passage chamber opening to thereby provide a sharp cutoff in the application of the material from said opening.

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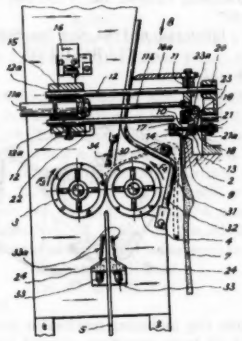
**4,516,703**

## APPARATUS FOR REVERSING HOSE

**Mario Orosei, Reggio Emilia, Italy, assignor to Fadis S.p.A., Solbiate Arno, Italy**

**Filed Mar. 7, 1984, Ser. No. 587,213**
**Claims priority, application Italy, Mar. 9, 1983, 19972 A/83**
**Int. Cl.³ D05B *21/00***
**U.S. Cl. 223—39** **14 Claims**



1. Apparatus for turning hose inside out after a seaming operation to form a closed end in the hose comprising a pair of contra-rotatable rollers urged towards each other to form a nip therebetween, transport means engageable with said closed end of the hose and operable to present said closed end to said nip, a rod displaceable through said nip to engage said presented closed end, roller rotating means operable to contra-rotate said rollers in the sense to draw said presented closed end and said hose into said nip, rod displacing means operable in synchronism with said roller rotating means to enter said rod into said nip as said closed end is drawn into said nip and to advance said rod through said nip in engagement with said closed end to displace said closed end away from said rollers as said rollers continue to draw said hose into said nip and about said rod.

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**4,516,704**

## HOSIERY DONNING AID

**Harry C. Hagman, 6122 Portland Ave. South, Minneapolis, Minn. 55417**

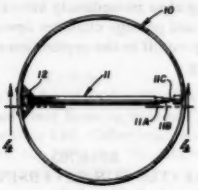
**Filed Jul. 16, 1984, Ser. No. 631,217**
**Int. Cl.³ A47J *51/06***
**U.S. Cl. 223—111** **2 Claims**

1. A device for aiding the infirm in donning hosiery, said device comprising:

(A) a rigid hoop of a size sufficiently large to permit the user's foot to fit loosely therein, said hoop having smooth inner and outer surfaces, the outer surface being engageable by the stretched open end of a sock or stocking, and

(B) a single slender rigid elongated telescopic handle pivot-

ally secured to the inside surface of one side of said hoop, the length of said handle when telescoped being less than



the inside diameter of the hoop, whereby the handle may be collapsed within the hoop for storage of the device.

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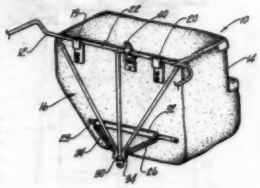
**4,516,705**

**PANNIER WITH HOOK AND SPRING MECHANISM**

**W. Shaun Jackson, Eclipse, Inc. P.O. Box 7370, Ann Arbor, Mich. 48107**

**Filed Jan. 6, 1984, Ser. No. 568,632**
**Int. Cl.³ B62J** *9/00*
**U.S. Cl. 224—32 A** **5 Claims**



1. A pannier bag mounting mechanism including:
a plurality of hook members adapted to grasp the upper horizontal member of a bicycle carrier frame;
a rigid elongate member secured in a generally horizontal position to the back portion of the pannier bag;
a spacing member slideably mounted on the rigid elongate member; and
a resilient member slideably mounted at two points along the rigid elongate member with the spacing member located on the elongate member between the two points, the resilient member including means for releasably securing the resilient member to a lower portion of a bicycle carrier frame, whereby
when the resilient member is anchored to the lower portion of the carrier frame, a downward force is exerted upon the rigid elongate member at each of the points where the resilient member is slideably mounted upon the rigid elongate member, tending to urge the hook members downward over the upper horizontal member of the carrier frame in a secure and balanced fashion.

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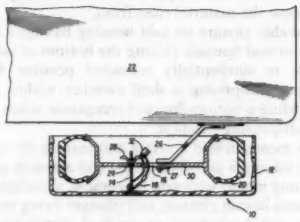
**4,516,706**

**SPARE TIRE COVER**

**Roy G. Niehaus, 3611½ Ponciana Dr., Akron, Ohio 44319**

**Filed Aug. 3, 1983, Ser. No. 519,976**
**Int. Cl.³ B62D** *43/02*
**U.S. Cl. 224—42.2** **4 Claims**

1. A device for securing a tire and wheel to the outside of a vehicle comprising:
a rigid shroud covering the exposed portions of the tire;
a bolt secured to the inner surface of said shroud in an off center manner and having a threaded portion;
a loop of flexible cable encircling said bolt; and
a nut in threadable communication with said bolt and having an aperture at its extremity for receiving a lock mechanism;
wherein a tire, mounted on a wheel, is positioned within said shroud, said bolt passing through a lug nut aperture of said wheel, said flexible cable extending through the axle aperture of said wheel;
wherein said nut is threadably engaged onto said bolt engaging said wheel; and



wherein said flexible cable and said nut are secured by said locking mechanism, thereby preventing rotation and disengagement of said nut from said bolt.

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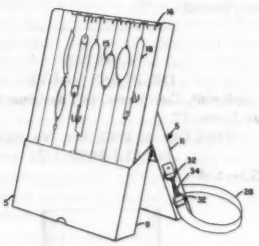
**4,516,707**

**FISHING PLUG AND LURE ORGANIZER**

**Joseph R. Crapanzano, 602 Shore Ave., Ship Bottom, N.J. 08008**

**Filed Feb. 24, 1984, Ser. No. 583,444**
**Int. Cl.³ A01K** *97/06*
**U.S. Cl. 224—202** **3 Claims**

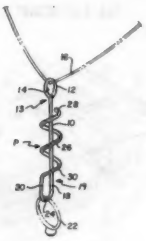


1. A fishing plug and lure organizer in the form of a portable container for supporting and displaying fishing plugs and lures arranged in an orderly manner for ease of transport and selection comprising,
(a) a housing unit,
(b) cover means for said unit telescopically slidable thereover and being composed of distinct upper and lower sections hinged along a single common edge and surface intermediate their extremities, the upper section being disposed to reside outside the housing to form a support therefore, and the lower section simultaneously residing over and covering the lower portion of said housing to allow viewing the contents of said housing,
(c) transparent means in said cover in the upper section thereof disposed to permit viewing the contents of said container including fishing plugs and lures located therein when both cover sections telescopically enclose the housing,
(d) a removable holder carried by said housing including mounting means thereon and forming a part thereof disposed to individually maintain said plugs and lures in an orderly array and display for the selection thereof, and
(e) securing means carried by said housing and cover during the transport thereof.

## 4,516,708
## FINGER RING HOLDER

Lee A. Elliott, 7425 Lamon Ave., Skokie, Ill. 60077

Filed Jan. 30, 1984, Ser. No. 574,973
Int. Cl.[3] A44C *11/02, 9/00*
U.S. Cl. 224—257 7 Claims



1. A ring holder for attachment to a necklace or the like, which does not require resiliency to retain a ring thereon, comprising:

(a) a first member having first and second end portions including means disposed at said first end portion for vertically suspending said first member from said necklace;

(b) a generally U-shaped loop, one leg of said loop extending from said second end portion of said first member for receiving a ring thereon;

(c) a second member extending from the other leg of said loop and including a plurality of spirals spaced from said first member a distance sufficient to permit a ring to be freely placed between said first and second members and generally helically disposed about said first member;

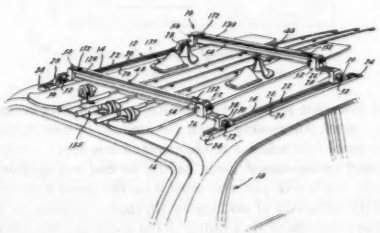
(d) said second member terminating in an end spaced from said first end portion a distance sufficient to permit a ring to be placed about said terminating end and between said first and second end portions;

(e) whereby said ring will spiral about said second member and be received and stored on said loop and thereby retained by said spirals without permitting substantial vertical movement of the ring when vertical motion is imparted to the ring holder and thus avoiding accidental removal therefrom.

## 4,516,709
## VEHICLE ARTICLE CARRYING DEVICE

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Filed Jul. 11, 1983, Ser. No. 512,394
Int. Cl.[3] B60R *9/12*
U.S. Cl. 224—315 15 Claims



1. A vehicle article carrier for the horizontal body surface of an automotive vehicle comprising:

a cross member extending laterally of said body surface, having an article engaging surface;

first and second bracket means;

means for removably and adjustably mounting said first and second bracket means to said cross member;

means for removably clampingly engaging said mounting means to said cross member; and

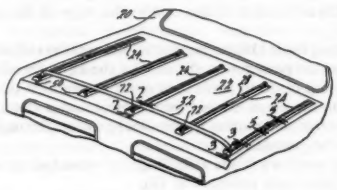
an article restraint element extending between and secured to said first and second bracket means;

wherein said bracket means includes a housing which combines with said cross member to encapsulate said mounting means and said engaging means and said article restraint element and said article engaging surface of said cross member cooperate to restrain articles disposed upon said carrier.

## 4,516,710
## ARTICLE CARRIER FOR AUTOMOTIVE VEHICLES

John A. Bott, 931 Lake Shore Dr., Grosse Pointe Shores, Mich. 48236

Continuation of Ser. No. 485,859, Apr. 18, 1983, Pat. No. 4,440,333, which is a continuation of Ser. No. 242,138, Mar. 9, 1981, abandoned, which is a continuation of Ser. No. 56,373, Jul. 10, 1979, abandoned, which is a division of Ser. No. 924,072, Jul. 7, 1978, Pat. No. 4,182,471, which is a division of Ser. No. 743,602, Nov. 22, 1976, Pat. No. 4,099,658, which is a continuation of Ser. No. 486,415, Jul. 8, 1974, abandoned. This application Nov. 23, 1983, Ser. No. 554,683
The portion of the term of this patent subsequent to Apr. 3, 2001, has been disclaimed.
Int. Cl.[3] B60R *9/00*
U.S. Cl. 224—324 5 Claims



1. An article carrier for an automobile including at least two parallel slat-like elements fixedly secured on a generally horizontally extending exterior body surface,

said slat-like elements on said surface in respective positions on opposite sides of the longitudinal axis of said automobile and extending substantially parallel to the longitudinal axis of the automobile and each having an upper article supporting surface,

said support surfaces being located between said body surface and the lower side of articles on said carrier, each of said slat-like elements having major and minor transverse dimensions with said major dimensions being parallel to said body surface and said supporting surface,

first fastening means associated with said slat-like elements,

a pair of article securing members disposed upon said slat-like elements and a restraining bar extending laterally between and secured adjacent its opposite ends to said members,

said restraining bar being located above said automobile body surface and said slats, and

second fastening means on each of said members and cooperable with said first fastening means for longitudinally slideably adjusting said members and said restraining bar upon said slat-like elements.

4,516,711

## DISPENSER FOR CONTINUOUS, SEVERABLE STRIPS

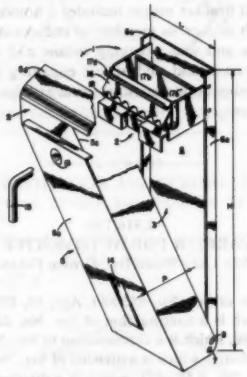
Jacqueline Barege, 2 rue de General Hoche, 31200 Toulouse, France

Filed Oct. 12, 1983, Ser. No. 541,038

Claims priority, application France, Oct. 13, 1982, 82 17420; Jan. 21, 1983, 83 01050

Int. Cl.³ B65D *85/671*

U.S. Cl. 225—20 13 Claims



1. A dispenser for continuous, severable strips, in particular paper strips, comprising:

a case (**1**) for holding said strip including a passageway (S) for the end of said strip,

a guide wall (**10**) in said case near the passageway (S) and having an inside zone (**10***a*) extending into the case and a sill (**10***b*) at the exit of this case at the edge of the passageway (S),

a cutting blade (**16**) having cutter means (**16***a*) and being hinged near the passageway (S) about a shaft (X) for allowing said cutting blade to pivot between a natural rest position adjacent the plane of said passageway and a cutting position wherein said cutting means (**16***a*) projects through the plane of the passageway,

a first auxiliary blade (**17**) hingedly mounted on a shaft (Y) adjacent said passageway (S),

said first auxiliary blade including a cover section (**17***a*) extending from one side of its hinge (Y) into the case and contacting the inside zone (**10***a*) of the guide wall to bound a path (C) for the strip and a stop section (**17***b*) arranged on the other side of its hinge (Y) whereby the cutting blade (**16**) when in the cutting position abuts against said stop section (**17***b*) under pressure and in the natural rest position of the cutting blade (**16**), said cover section (**17***a*) rests against the guide wall (**10**) for braking the strip in the path (C), and so that in the cutting position of said cutting blade (**16**) said auxiliary blade (**17**) is subjected by the pressure exerted on said stop section (**17***b*) to a moment (M) so that said cover section (**17***c*) pinches and locks the strip within the path (C),

a second auxiliary blade comprising a protection section (**18***a*) for said cutting means (**16***a*) of said cutting blade and being, this second auxiliary blade hinged about a shaft (Y) offset from the shaft of said cutting blade (**16**) in order to pivot between a natural rest position corresponding to the natural rest position of the cutting blade (**16**), wherein said auxiliary blade (**18**) is near the sill (**10***b*) of the guide wall and acts as a support to the cutting blade (**16**), the cutting means (**16***a*) of said cutting blade (**16**) being withdrawn against the protection section (**18***a*) of said auxiliary blade (**18**), and a retracted position corresponding to the cutting position of the cutting blade (**16**) wherein said auxiliary blade (**18**) is behind said cutting blade and said cutting means.

4,516,712

## CUTTING DEVICES FOR TILES

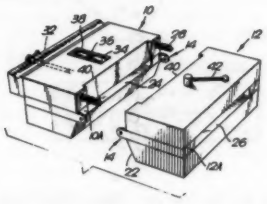
Leslie A. Whalley, 109 College Rd., Norwich, England (NR2 3JP)

Filed Mar. 31, 1983, Ser. No. 480,891

Claims priority, application United Kingdom, Dec. 31, 1982, 8237084

Int. Cl.³ B26F *3/00*

U.S. Cl. 225—96.5 9 Claims



1. A tile cutter comprising first and second blocks having proximate edge faces at which the two blocks are hinged together, respective slots in said blocks which are coplanar in one position of the relatively hinged blocks and which then extend through said two blocks in a plane parallel to and at least passing close to the hinge axis, whereby a tile can be inserted through the slot in the second block and past the proximate edge faces to enter the slot in the first block, means enabling an inserted tile to be positioned so that the two blocks can subsequently be folded to snap the tile at a scribed line thereon, said proximate edge faces having regions which are in substantially abutting relationship, and said edge faces also being cut away on one side of the slots.

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4,516,713

## LOW-WIRE SENSOR

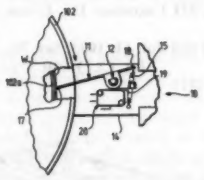
Wilhelmus Meijer, Venlo, Netherlands, assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 5, 1983, Ser. No. 511,038

Claims priority, application United Kingdom, Jul. 7, 1982, 8219708

Int. Cl.³ B27F *7/27, 7/38*

U.S. Cl. 227—2 3 Claims



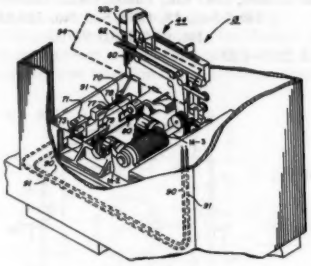
1. A low-wire sensor for apparatus in which wire is supplied from a spool, for sensing when the amount of wire remaining on the spool falls below a predetermined low level, comprising a pivoted spring-biased lever having an end engageable with the outer surface of the wire wound on the spool and movable under the influence of said spring through a position in which said lever extends along a radius of the spool and the end of the lever is spaced a predetermined distance from the core of the spool, towards a low-wire indicating position at one side of the radius from positions on the other side of said radius in which it engages and is restrained by wire exceeding said low level.

4,516,714

## HIGH SPEED DUPLICATOR WITH SORTER/STAPLING APPARATUS AND STAPLER POSITIONING CONTROL

Oskar J. Braun, Williamson, and Lawrence C. Hubler, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 21, 1983, Ser. No. 563,736
Int. Cl.[3] B27F 7/17
U.S. Cl. 227—78 3 Claims



1. In a fastening apparatus having two or more fastening devices adapted to apply one or more fastening elements relative to an edge of sheets of material to bind the same, the improvement comprising:

a drive means associated with each of the fastening devices for moving the respective device in either direction along a line parallel to the edge to be fastened,

control means connected to each of said drive means for actuating the same selectively in either direction and for a desired distance along said line, and

means for indicating the location of each of the fastening devices in relation to an edge of various sizes of sheets to be fastened.

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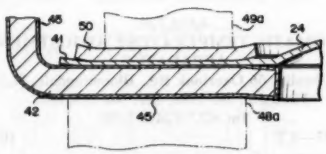
4,516,715

## VACUUM CONTAINER OF RADIATION IMAGE MULTIPLIER TUBE AND METHOD OF MANUFACTURING THE SAME

Fumio Sugimori, Yokohama; Chikae Nishino, Sagamihara, and Norio Harao, Ayase, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Division of Ser. No. 260,399, May 4, 1981, Pat. No. 4,423,351.
This application Feb. 18, 1983, Ser. No. 467,918
Claims priority, application Japan, May 6, 1980, 55-59710; May 29, 1980, 55-70760
Int. Cl.[3] H01J 9/26; B23K 20/02
U.S. Cl. 228—208 4 Claims




1. A method of manufacturing a vacuum container of a radiation image multiplier tube in which a member of Al or an Al alloy containing a radiation input window is airtightly joined to an insulation member of glass or ceramic containing an output portion for outputting radiation image multiplied signals through a first ring made of Fe or Fe alloy, wherein, in bonding the first ring with the member of Al or Al alloy, one or more thin layers of a metal selected from the group consisting of Ni, Cu and Al are previously formed by metal plating or deposition on a portion to be joined of the member of Al or Al alloy and/or a portion to be joined of the first ring, are superposed in planes perpendicular to the axis of the tube and are airtightly joined by hot pressure-bonding while applying pressure in the direction of the tube axis by means of a press apparatus in such a manner that said portion to be joined of the member Al or Al alloy is compressed and caused to be substantially thinner than its initial thickness by the hot pressure-bonding.

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4,516,716

## METHOD OF BRAZING WITH IRON-BASED AND HARD SURFACING ALLOYS

Brian C. Coad, San Francisco, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Continuation of Ser. No. 442,537, Nov. 18, 1982, abandoned.
This application Sep. 29, 1983, Ser. No. 536,827
Int. Cl.[3] B23K 1/04
U.S. Cl. 228—263.15 6 Claims

1. A method of brazing two similar ferrous based alloys substrates comprising:

(a) determining the chromium, nickel, manganese, molybdenum, vanadium, tungsten, columbium, and a titannium content of said ferrous based substrates,

(b) providing brazing alloy consisting essentially of from about 2% to about 6% by weight of boron, from about 5% to about 12% by weight of silicon and at least one element selected from the group consisting of chromium, nickel, manganese, molybdenum, vanadium, tungsten, columbium and titanium, said elements, when present, being present in an amount of up to about 35% by weight of chromium, and in an amount of up to about 25% by weight of nickel, up to about 12% by weight of manganese, up to about 5% by weight of molybdenum, up to about 5% by weight of vanadium, up to about 15% by weight of tungsten, up to about 3% by weight of columbium and up to about 2% by weight of titanium, the balance of said alloy being iron in amounts greater than about 50% by weight of said alloy wherein said chromium, nickel, manganese, molybdenum, vanadium, tungsten, columbium and titanium are at approximately the same weight level as these elements are present in the ferrous based alloys substrate being brazed,

(c) providing a mutual contact between said alloy and said substrates to achieve an assembly,

(d) heating said assembly to at least the liquidus temperature of said brazing alloy for a sufficient time to achieve flow, and

(e) cooling said brazed assembly to the ambient temperature.

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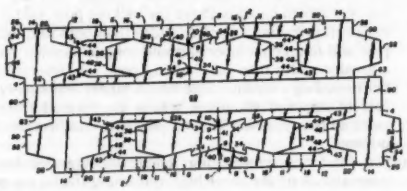
4,516,717

## CONTAINER DIVIDER

John J. Curran, 4470 Granville St., Vancouver, British Columbia, Canada V6M 3L8

Filed Nov. 14, 1983, Ser. No. 550,964
Claims priority, application Canada, Nov. 25, 1982, 416410
Int. Cl.[3] B65O 5/48
U.S. Cl. 229—15 9 Claims



1. A container divider, comprising:

(a) a first side panel, a first end panel, a second side panel,

and a second end panel, said panels being hingedly connected together end to end in the foregoing sequence so as to be inwardly swingable about connected ends from coplanar positions when the divider is in a flat position, to respective swung positions when the divider is in an erected position defining an enclosed quadrilateral with lengthwise remote ends of said first side and second end panels abutting one another;

(b) a cross member with an upstanding end hingedly connected to said first side so as to be inwardly swingable about the connected end from a position coplanar with said panels when the divider is in the flat position, to a swung position when the divider is in the erected position and, in which an end of said cross member abuts said second side panel; and

(c) two tongue and mating receptacle combinations, the tongue and mating receptacle of one combination extending from respective abutting portions of said first side and second end panels, and the tongue and mating receptacle of the other combination extending from respective abutting portions of said cross member and said second side panels, so that the two combinations can retain abutting portions in engagement when the divider is in the erected position.

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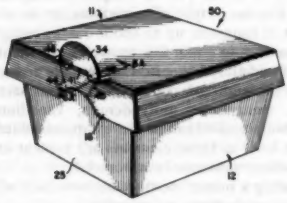
**4,516,718**

## CARTON WITH AUTOMATIC LOCK

**Hampton E. Forbes, Jr., Wilmington, Del., assignor to Westvaco Corporation, New York, N.Y.**

**Filed Sep. 20, 1983, Ser. No. 534,069**
**Int. Cl.³ B65D *5/22***
**U.S. Cl. 229—33** **13 Claims**



1. A carton with an automatic locking closure means comprising:

(a) A tray member including side walls extending upwardly from a bottom panel about score lines;

(b) a lid member including side walls extending downwardly from a top panel about score lines;

(c) at least one male locking element connected to and extending upwardly from the upper edge of one of the side walls of the tray member in the same general plane of the side wall as an integral extension thereof, said locking element including a first shoulder portion which extends above the top edge of the side wall, a locking post integral with said shoulder portion which extends above the shoulder portion, and a tongue member integral with said locking post which extends above the locking post, said shoulder portion having a greater width than both said locking post and tongue member and said tongue member having a greater width than said locking post, said tongue member including a leading edge which tapers rearwardly to a pair of opposed shoulders which are formed from the material between said locking post and said first shoulder portion;

(d) at least one cooperating female locking slot located generally along the score line connecting the lid top panel to an adjacent side wall, said slot being in the form of a continuous cut line comprising a central segment located in the top panel portion of the lid closely adjacent to said score line and at the ends of said central segment a pair of terminal segments located partly in the top panel and partly in the adjacent side wall to provide locking tabs which automatically engage the locking shoulders of said tongue element when the lid and tray are brought together to form the carton.

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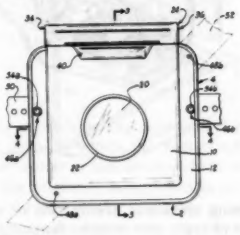
**4,516,719**

## WELL SITE DOCUMENT CONTAINER

**Randell D. Ball, 1141 Elk, Yukon, Okla. 73099**

**Filed Aug. 18, 1983, Ser. No. 524,450**
**Int. Cl.³ B65D *91/00***
**U.S. Cl. 232—1 D** **12 Claims**



1. A container for holding an object at a well site, comprising:

a substantially planar housing having an open-ended cavity defined therein for receiving said object and having a flanged edge portion extending adjacent at least a portion of said cavity;

a window disposed in said housing so that said object can be seen at a distance from said housing when said object is disposed in said cavity;

a lid;

means for connecting said lid to said housing so that said lid provides a substantially fluid-tight enclosure to said open-ended cavity when said lid is in a closed position; and

attachment means in said flanged edge portion for enabling said housing to be attached to a plurality of structures at said well site, said structures including a horizontal strut and an angular strut, said attachment means including a first pair of holes defined in said edge portion near opposite corners thereof so that said first pair of holes defines a line parallel to said angular strut and said attachment means further including a second pair of holes defined in said edge portion and spaced from said first pair of holes so that said second pair of holes defines a line parallel to said horizontal strut.

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**4,516,720**

## AUTOMATIC TEMPERATURE ADJUSTMENT APPARATUS

**James E. Chaplin, 66 Overlook Rd., Bloomingdale, N.J. 07403**

**Filed Jul. 28, 1983, Ser. No. 518,118**
**Int. Cl.³ F24D *3/00***
**U.S. Cl. 237—8 R** **10 Claims**

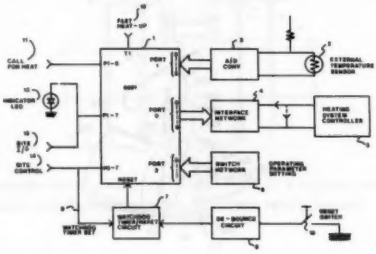
1. An apparatus for controlling the operation of a heating system, said heating system being for the purpose of maintaining the temperature of a structure at a selected value, said heating system consisting of a central heat source, a temperature sensing thermostat used to control the operation of said heat source by sensing the internal temperature of the structure being heated, heat radiating elements distributed throughout said structure, and a fluid heating medium capable of existing in a useful form over a wide temperature range, said medium being used to distribute the heat from said central heat source to said heat radiating elements, said apparatus comprising:

means for measuring the temperature external to said structure being heated;

means for measuring the percentage of time that a heating system control signal is in a state indicating that heat is required to maintain said structure at the desired temperature level, said control signal typically being generated by the said heating system's temperature sensing thermostat;

a closed-loop process for setting the temperature of said fluid heating medium to the minimum, and also most efficient, value possible with the current conditions external to said structure being heated, said process comprising:

first function for periodically determining the change, if any, required in the current value of the temperature of said fluid heating medium, based on the said measured temperature external to said structure, and an operating parameter, and modifying said value as required, and



second function for periodically determining the change, if any, required in the current value of said operating parameter, based on said measurement of the percentage of time that the heating system control signal is in a state indicating that heat is required, compared to a reference percentage, and modifying said value as required, the closed loop nature of said process being caused by the fact that the said measurement of the heating control signal is itself affected by the said temperature of the fluid heating medium; and

means for controlling the said heat source of the heating system to obtain the temperature of said fluid heating medium as determined by said closed-loop process.

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**4,516,721**

**PRESSURELESS LARGE-AREA HEATING SYSTEM**

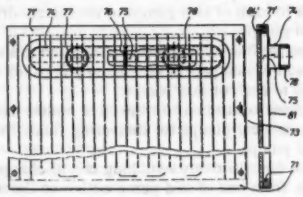
**Karsten Laing, Kaiserallee 51, 7500 Karlsruhe; Oliver Laing, Weissdornweg 14, 7400 Tübingen, both of Fed. Rep. of Germany, and Ludwig Ludin, Kesselackerweg, 5611 Anglikon, Switzerland**

**Filed Mar. 16, 1982, Ser. No. 358,807**

**Claims priority, application Switzerland, Mar. 16, 1981, 1753/81**

**Int. Cl.³ F24D *5/10***

**U.S. Cl. 237—69** **4 Claims**



1. A large-area heating system having a passage forming a hollow body through which a first heat carrier having a relatively low pressure and low temperature is adapted to flow and capable of being integrated into ceilings, walls or floors, a pump for circulating said first heat carrier through said passage, said pump and said passage forming part of a first heat carrier circuit, a second heat carrier circuit through which a second heat carrier having a higher pressure and a higher temperature than said first heat carrier is adapted to flow, and a heat exchanger for exchanging heat relatively between said first and said second heat carriers, characterized in that said passage comprises a plurality of parallel juxtaposed channels formed by a pair of spaced thermo-plastic wall members connected by a plurality of parallel extending webs to form a panel with a plurality of the channels being connected to an inlet manifold and to an outlet manifold whereby flow of said first heat carrier is in parallel through a plurality of said channels and whereby substantially the complete area of the wall members is contacted by said first heat carrier.

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**4,516,722**

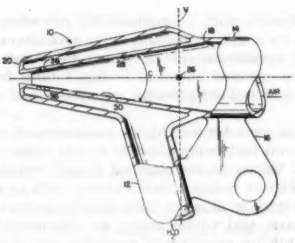
**SNOW-MAKING NOZZLE**

**Joseph J. Avery, Rutland, Vt., assignor to Sherburne Corporation, Killington, Vt.**

**Filed Aug. 22, 1983, Ser. No. 525,326**

**Int. Cl.³ F25C *3/04***

**U.S. Cl. 239—14** **7 Claims**



1. In a system for making snow from compressed air and water, an improved nozzle structure comprising:

means defining a longitudinally extending air passageway with a generally cylindrical inlet end portion for connection with a source of air under pressure,

said air passageway including an outlet of generally rectangular cross section and with the ratio of the longer side of said outlet to the shorter side of said rectangular outlet being in the range of at least ten to one,

said air passageway further including an intermediate portion between said air inlet and outlet, said intermediate portion being of rectangular cross section with side walls arranged in opposed pairs, one pair being longer than the other,

said longer pair of said pairs of opposed side walls continuously converging in a downstream direction to form the longer sides of said generally rectangular outlet and the other pair of opposed side walls diverging in said downstream direction to form the shorter sides of said rectangular outlet,

housing means defining a water jacket surrounding said intermediate passageway portion and including at least one water inlet opening for connection with a source of water under pressure, and

a plurality of water ports opening into said air passageway at said longer sides, all of said water ports having its axis inclined in said downstream direction at an angle in the range between 35 to 40 degrees with respect to a horizontal plane of symmetry through said longitudinal axis of said air passageway, all ports being equally spaced from one another along a line in each of said longer side walls, and said port axes located in vertically opposed relation so that said opposed ports are spaced from one another vertically inside said outlet in said opposed side walls by a dimension X at

least approximately equal to the longitudinal spacing of the intersection of the port axes from said outlet.

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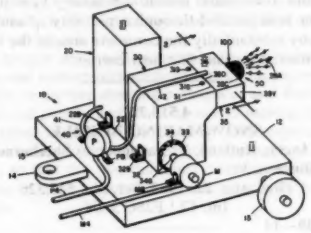
**4,516,723**

## FINE-DROPLETS SPRAYER SYSTEM FOR TERRAIN VEHICULAR USE

**Myron C. Hesse, 9955 Bloomfield Dr., Omaha, Nebr. 68114**

**Filed Aug. 27, 1982, Ser. No. 412,097**
**Int. Cl.³ B05B *3/02*; A01G *25/09***
**U.S. Cl. 239—77** **3 Claims**



1. In combination with a longitudinally extending surface vehicle means for rollably traversing along agricultural terrain, a fine-droplets agricultural sprayer system for castably spraying highly concentrated chemical in liquid form from said traversing vehicle toward growing vegetation, and comprising:

A. a reservoir tank for said highly concentrated chemical, said reservoir tank being attached to said vehicle means;

B. a housed blower means attached to said vehicle means and said blower means communicating with an attached volute extending along a substantially horizontal longitudinal-axis, said volute having an inlet-mouth and an outlet-mouth for respectively receiving and discharging an airstream from the blower means;

C. pumping means attached to said surface vehicle means and adapted to pump said liquid from said reservoir along a hose means into the volute;

D. said hose means including a reservoir-hose extending from the reservoir to the pump means and a volute-hose extending from the pump means to the volute and therewithin communicating with the inlet-end of a sprayhead means axial tube portion; and

E. said sprayhead means being attached to and surrounded by the volute and comprising:

Ei. said axial tube lying substantially parallel to the volute longitudinal-axis and including said inlet-end located nearer to the volute inlet-mouth and an outlet-end located nearer to the volute outlet-mouth,

Eii. a plurality of web-like deflectors radiating outwardly from said axial tube at the outlet-end thereof,

Eiii. a shank revolvably surrounding the axial tube between inlet-end and outlet-end,

Eiv. a longitudinal multi-perforate diffuser surrounding the tube outlet-end and said web-like deflectors and being threadedly engaged with said shank,

Ev. a sleeve-like screen surrounding said diffuser and being co-rotatable with said shank and diffuser, and

Evi. a plurality of vanes respectively radiating from the shank along a vane-axis and being of the contoured blade type whereby said blower means airstream impinging upon the vanes causes rotation of the shank about the tube, each contoured blade vane having a baseend adjustably twistably secured to said shank about the vane-axis whereby rotational speed of the shank diffuser and screen might be controllably adjusted for substantially constant velocity of the airstream emerging from said housed blower means, whereby liquid being pumped into the tube inlet-end and emerging from the tube outlet-end will be whipped by the rotating diffuser and screen into fine-droplets which is also castably sprayed by the blower airstream toward growing vegetation.

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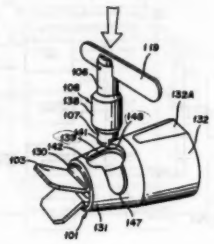
**4,516,724**

## SPRAYING DEVICE

**Gösta Hellman, Svedjevägen 21, 436 00 Askim, Sweden**

**PCT No. PCT/SE82/00024, § 371 Date Sep. 28, 1982, § 102(e) Date Sep. 28, 1982, PCT Pub. No. WO82/02501, PCT Pub. Date Aug. 5, 1982**
**PCT Filed Jan. 29, 1982, Ser. No. 432,927**
**Claims priority, application Sweden, Jan. 29, 1981, 8100603**
**Int. Cl.³ B05B *15/02***
**U.S. Cl. 239—119** **9 Claims**



1. A spraying device comprising: a housing, a spray nozzle holder having a nozzle holding portion, and two mounting elements extending in opposite directions transverse to the housing, one of said mounting elements being adapted to bear a rotating handle, said holder being rotatable in said housing transverse to the spraying direction of said nozzle between a spraying position and a reversed position for blowing the nozzle clean, said housing having two openings substantially opposite to each other for accommodating respectively said two mounting elements, at least one of said openings having a width which is less than the width of said nozzle holding portion, said housing also having at least one slot-shaped opening in which said holder is movable transverse to said housing when said holder is being mounted in, or dismounted from, said housing.

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**4,516,725**

## DUAL COMPONENT PUMPING SYSTEM

**James E. Cavanaugh; Robert D. Hetherington, both of Sunland, and Thomas A. Parmley, Downey, all of Calif., assignors to 501 Binks Manufacturing Co., Franklin Park, Ill.**

**Filed Sep. 30, 1982, Ser. No. 432,081**
**Int. Cl.³ B05B *7/24***
**U.S. Cl. 239—127** **8 Claims**

1. A dual fluid component supply system comprising;

a pair of alternating reciprocal pumps;

a double-acting reciprocal air motor connected by a common shaft to each of said pumps to alternately drive said reciprocal pumps;

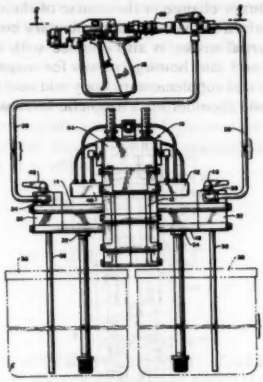
a pair of separate fluid supply means connected to a separate inlet to each of said pair of reciprocal pumps for delivering a fluid to each of said pumps;

discharge means connected to respective outlets from each of said reciprocal pumps for delivering fluids from said reciprocal pumps;

switch means for selectively switching said discharge means alternately from one of said pump outlets to the other;

said switch means adapted to switch the other of said pumps into a bypass made so that fluid from said supply means continuously circulates from said supply means through said other pump back to said supply means while said one of said pumps is delivering fluid to said discharge means;

whereby fluid is continuously supplied to said discharge means from one of said pumps while the other of said



pumps continuously circulates fluid in a bypass mode to keep said fluid in said supply means ready for use.

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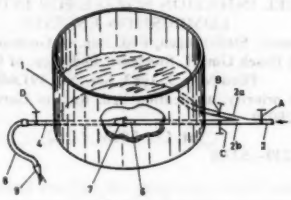
**4,516,726**

## MIXING AND SPRAYING APPARATUS FOR LIQUIDS, OPTIONALLY FOR POWDER AND LIQUID

**Karl H. Hoie, Hemings vei 4, Oslo 3, Norway**

**Filed Apr. 19, 1983, Ser. No. 487,191**
**Claims priority, application Norway, Feb. 24, 1983, 830657**
**Int. Cl.³ B05B** *7/26*
**U.S. Cl. 239—317** **14 Claims**



1. A mixing and spraying apparatus for liquids, optionally for powder and liquid in admixture, including a preferably round mixing tank with a feed line for liquid under pressure and an outlet conduit with a control valve/spigot, wherein additional liquid or powder is introduced into the tank via the top opening of the tank, the liquid feed line being divided into a first, and a second, branch, the second branch discharging via a nozzle into an open end of the outlet conduit within the tank at the lower section of the tank thereby forming an injection pump for carrying and conveying the admixed media through the outlet conduit to an optional connected hose with a spray nozzle or some other spray means, the mixing and spraying apparatus comprising:

said mixing tank being at atmospheric pressure,

said first branch discharging into the lower section of the mixing tank for introducing liquid into the tank and for forming a vortex to facilitate admixture of said liquid with a powder or optionally with another liquid which may be introduced from the top of the tank, and

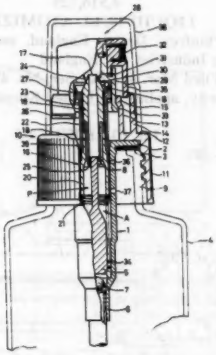
each branch including a control valve or spigot.

**4,516,727**

## MANUALLY-OPERATED SPRAYER

**Tadao Saito; Takao Kishi, and Yoshiyuki Kakuta, all of Tokyo, Japan, assignors to Yoshino Kogyosho Co., Ltd., Japan**

**Filed May 26, 1983, Ser. No. 498,508**
**Int. Cl.³ B05B** *9/043*
**U.S. Cl. 239—333** **4 Claims**



1. A manually-operated sprayer comprising:

a container for liquid;

a first lower cylinder depending into the container and inserted into the same;

a suction valve disposed at the bottom portion of the first lower cylinder;

a mounting member engaged with the neck portion of the container;

a spray head elevationally movably associated with an upper portion of the mounting member, said spray head including a nozzle hole and a discharge valve hole communicating with said nozzle hole;

a movable member having its upper end portion formed as a discharge valve body;

a cylindrical plunger fixed to the outer surface of the movable member, said cylindrical plunger including a first piston formed at a lower end portion thereof and a second piston formed at an upper end portion thereof, said first piston being slidably received by an inner surface of the first lower cylinder, and said second piston having a larger diameter than said first piston;

a second upper cylinder formed within the spray head in axial alignment with the first lower cylinder, said second upper cylinder having a larger diameter than the first lower cylinder and receiving in a slidable manner the second piston of the cylindrical plunger;

a spring upwardly biasing the movable member and the cylindrical plunger;

a discharge valve comprising the discharge valve body and the discharge valve hole; and

a pump chamber comprising the internal spaces of said first and second cylinders and a passage communicating between both of said cylinders;

whereby, when the pressure in the pump chamber is increased by a pumping action, the movable member and the cylindrical plunger are moved down against the biasing force of the spring so that the discharge valve is opened thereby to atomize the liquid out of the nozzle hole;

an air cylinder formed inside the movable member and communicating with the nozzle hole through an opening axially perforated in the upper end portion of the movable member; and

an air cylinder plunger provided within the first lower cylinder and having its upper end portion slidably received by the inner surface of said air cylinder, whereby when the

spray head is moved down to depress the pump chamber, air is blown out from the air cylinder to the nozzle hole and mixed with the pressurized liquid from the pump chamber, and, when the spray head is moved up to expand the pump chamber, external air is sucked into the air cylinder through the nozzle hole.

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**4,516,728**

## LIQUID FUEL ATOMIZER

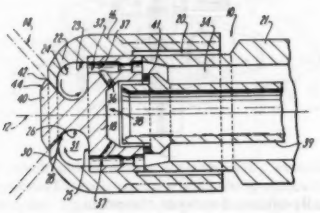
**Dennis R. Whinfrey, Derby, England, assignor to Northern Engineering Industries plc, England**

**Filed Mar. 4, 1983, Ser. No. 472,041**

**Claims priority, application United Kingdom, Mar. 26, 1982, 8208898**

**Int. Cl.³ B05B *7/00***

**U.S. Cl. 239—399** **10 Claims**



2. A liquid fuel atomizer comprising:

(a) a body;

(b) an annular chamber defined within said body, said chamber being bounded substantially by opposed surfaces of revolution generated by opposed arcs which have centres of curvature within said chamber, which are disposed generally transversely to the plane of said chamber and which have revolved about the central axis of said chamber;

(c) exit formations defined by said body for directing media leaving said chamber through said formations into a hollow diverging frusto-conical pattern;

(d) annularly-distributed internal passages defined within said body through which flows of fuel medium and atomising medium pass, the directions of said passages for one medium and the directions of respective passages for the other medium making intersections one with the other whereby media passing through said passages interact one with the other at said intersections; and

(e) openings defined with said body by which said media enter said chamber from said passages at positions which are such as to produce rotation of media therein and which are closer than said formations to said intersections.

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**4,516,729**

## FUEL INJECTION NOZZLE FOR INTERNAL COMBUSTION ENGINES

**Paul Füssner, Sindelfingen; Karl Hofmann, Remseck; Iwan Komaroff, Regensburg; Katsuoki Itoh, Leonberg; Kurt Seifert, Esslingen; Dietrich Trachte, Kornwestheim; Wilhelm Vogel, Stuttgart, and Hans-Jörg Vogtmann, Markgröningen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

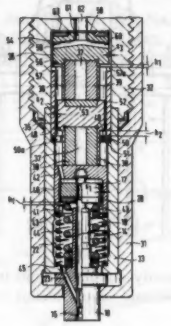
**Filed Sep. 22, 1982, Ser. No. 421,195**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1981, 3149276**

**Int. Cl.³ B05B *1/32***

**U.S. Cl. 239—453** **14 Claims**

1. A fuel injection nozzle for internal combustion engines, having a housing, a nozzle body in said housing, said nozzle body having a valve seat, and a displaceably guided valve closing member, said member being acted upon by a closing spring and capable of being urged counter thereto by a fuel pressure, and a supplementary body coupled with the valve closing member at the end of a first partial stroke thereof and together with a shoulder integral with the housing is arranged to effect an abrupt change in the course of the opening pressure, characterized in that said supplementary body at the end of the first partial stroke, is also coupled with said shoulder integral with said housing, means for magnetically coupling between said supplementary body and said valve closing member and said shoulder via a magnetic force which exerts a



holding force counteracting the fuel pressure applied to said valve closing member, said holding force being smaller than the maximum displacement force exerted by the fuel pressure upon said valve closing member, and that the elements are embodied and disposed such that after overcoming the magnetic coupling or holding force, the supplementary body tears away from its magnetic counterpart, i.e., said valve closing member and said shoulder, and the valve closing member is capable of moving onward to its fully open position.

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**4,516,730**

## FUEL INJECTION NOZZLE FOR INTERNAL COMBUSTION ENGINES

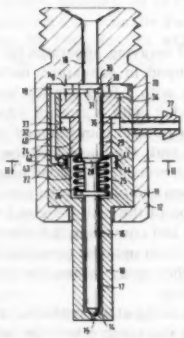
**Paul Füssner, Sindelfingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed May 5, 1983, Ser. No. 491,640**

**Claims priority, application Fed. Rep. of Germany, Jul. 28, 1982, 3228079**

**Int. Cl.³ F02M *47/02***

**U.S. Cl. 239—533.8** **13 Claims**



1. A fuel injection nozzle for internal combustion engines having a housing and further comprising a stepped piston acted upon by a spring means, said piston including a larger piston surface area and a smaller piston area, said larger piston surface

area defining a medium-pressure chamber communicating with a fuel inlet connection and the smaller piston surface area defining a high-pressure chamber formed directly in said housing, said high-pressure chamber arranged to communicate with the medium-pressure chamber via an overflow valve opening counter to a high pressure, and a valve needle means disposed coaxially within the stepped piston and the high-pressure chamber, which valve needle means is loaded by said spring means, said valve needle means monitoring at least one injection port communicating with the high-pressure chamber and has a high-pressure shoulder which is engaged by the high fuel pressure such as to effect opening.

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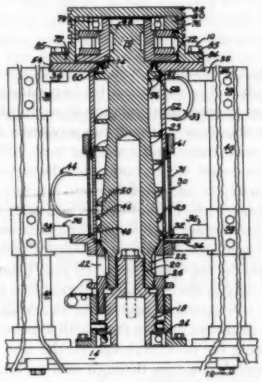
**4,516,731**

## DEBONING APPARATUS HAVING AUGER SEAL ON ONE END AND SUPPORT MEANS THEREFOR

**Jack A. Prince, and Bobby D. Standridge, both of Gainesville, Ga., assignors to Jack Prince, Inc., Gainesville, Ga.**

**Filed Sep. 30, 1982, Ser. No. 431,544**
**Int. Cl.³ B02C** *19/22, 23/16*
**U.S. Cl. 241—24** **18 Claims**



1. In a deboning machine for separating mixed particles of bone and meat products, such as obtained by grinding fish or chicken bones having meat thereon, comprising a machine frame, a motor mounted on said frame, a product auger having a first end and an opposed second end, said first end being driven by said motor, said auger being tapered on the outside and comprising auger blades arranged in a continuous helix for removing meat products, support means on the base for supporting said auger for rotation by said motor, bearing means for said auger, an auger housing mounted on said base and having said auger mounted therein and there being a product space between the inside of said housing and the exterior of said auger near the second end thereof, a bone outlet, a sleeve having holes therein mounted over said auger, a meat outlet, a product inlet mounted on said machines adjacent said second end of said auger and being in communication with said auger, and a seal adjacent the second end of said auger, the improvement comprising:

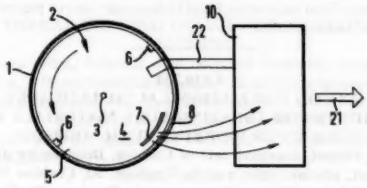
means adjacent the second end of said auger for directing the product mixture including fluids away from the second end of said auger and the seal and towards the first end of said auger and the product outlet.

**4,516,732**

## METHOD AND APPARATUS FOR COMMINUTING STUMPS

**Heino Kela, Ämmänsaari, and Matti Läspä, Ullava, both of Finland, assignors to Kajaani Oy, Finland**

**Filed Jan. 24, 1983, Ser. No. 460,622**
**Claims priority, application Finland, Jan. 25, 1982, 820227**
**Int. Cl.³ B02C** *18/08, 19/12*
**U.S. Cl. 241—24** **10 Claims**



1. A method of comminuting stumps, comprising the steps of feeding stumps into the upper end portion of a fixed generally cylindrical drum having a rotatable bottom surface, rotating said bottom surface to throw the stumps outwardly by centrifugal force against the drum, engaging the stumps with an abutment located on the peripheral edge of said bottom surface, moving the rotating stump into contact with a fixed generally curved blade disposed concentrically of said drum and located radially inward of said drum to comminute the stump to form comminuted particles, and discharging the comminuted particles in a generally horizontal plane tangentially through a discharge opening in the drum.

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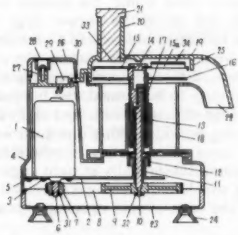
**4,516,733**

## ELECTRIC FOOD CUTTING MACHINE

**Shuichi Funagura, Ibaraki, and Katsufumi Nishio, Toyonaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**PCT No. PCT/JP82/00455, § 371 Date Jul. 20, 1983, § 102(e) Date Jul. 20, 1983, PCT Pub. No. WO83/01891, PCT Pub. Date Jun. 9, 1983**
**PCT Filed Nov. 30, 1982, Ser. No. 522,365**
**Claims priority, application Japan, Dec. 3, 1981, 56-195193; Dec. 3, 1981, 56-195194; Dec. 3, 1981, 56-195196; Dec. 3, 1981, 56-195197; Dec. 2, 1982, 56-194043**
**Int. Cl.³ B02C** *18/22*
**U.S. Cl. 241—79** **25 Claims**



1. An electric food cutting machine, comprising:

a main body;

an electric motor mounted on said main body;

a container mounted on said main body;

a disc-shaped cutter in said container, rotatively driven by said motor for cutting cut pieces from a food object to be cut;

a disc member positioned in said container below said cutter

for rotation by said motor in the same rotational direction as said cutter;

means, defining a cut pieces path terminating at said disc member, for directing the cut pieces cut from the food object to be cut to said disc member;

means, including said disc member, for discharging the cut pieces from said container; and

passage means, defining a passage in said container spaced from said cut pieces path extending away from said cutter, for directing any uncut portion of the food object to be cut not cut therefrom into the cut pieces, along the passage away from said cutter so as to separate the cut pieces from the uncut portion.

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**4,516,734**

## METHOD FOR LOADING AUTOMATICALLY MACHINES FOR TREATING BULK MATERIALS AND DEVICE FOR WORKING SUCH METHOD

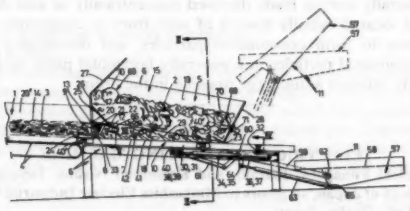
**Luc A. Pierret, deceased, late of Corbion, Belgium; by Joseph Robert, administrator, rue du Tambour, 32, Corbion (Bouillon), Belgium; Hubert Pierret, rue du Tambour 29, Corbion (Bouillon), Belgium; Gabriel L. Pierret, rue du Tambour 33, Corbion (Bouillon), Belgium; Maurice J. Pierret, rue de l'Eglise 15, Corbion (Bouillon), Belgium, and Jean-Marie M. Pierret, rue du Sommet 14, Corbion (Bouillon), Belgium**

**Filed Dec. 15, 1982, Ser. No. 449,855**

**Claims priority, application Belgium, Dec. 16, 1981, 0/206850**

**Int. Cl.³ B02C** *18/02*

**U.S. Cl. 241—283** **16 Claims**



1. An apparatus for automatically loading a machine which treats bulk materials, said bulk materials having some length and including materials such as fibers, yarns, fragments from woven or unwoven textiles, and plastics, said apparatus extracting from the bottom of a material mass, by means of projecting elements entering said mass, an amount of material to be formed into a strip which is to be fed to said machine, said apparatus comprising:

a hopper having a top and a bottom and four sides and being mounted on a fixed frame, the hopper top and bottom being open and along the hopper edge nearest to the machine to be loaded is provided a quadrangular opening extending from the hopper bottom, the cross-section of said opening substantially corresponding to the cross-section of said strip to be formed, the hopper bottom being shaped as a quadrilateral with four right angles and said opening being provided along one quadrilateral side;

at least two rows of projecting elements arranged in the hopper bottom, substantially at right angle to the hopper edge along which said opening is provided and at a lower level than the edge of said opening opposite the hopper bottom;

two movable bars on which are fixed the at least two rows of projecting elements, said two movable bars closing—off the hopper bottom and extending at right angles to said opening;

guides for causing said two movable bars to move along their lengthwise axis, the length of said bars being longer than the length of the hopper bottom, so that said two movable bars always close-off the hopper bottom;

control means provided to drive each one of said two movable bars with an alternating motion such that the projecting elements from each row move from the hopper side opposite said opening to beyond said opening, said control means being arranged so that during the time interval where one bar moves from said opening to said hopper side opposite said opening, the other bar moves in the opposite direction or is stopped; and

means to feed said material to said hopper.

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**4,516,735**

## METHOD AND APPARATUS FOR WINDING WEBS

**Keijo K. Snygg, Karhula, Finland, assignor to Lenox Machine Company, Inc., Lenox, Mass.**

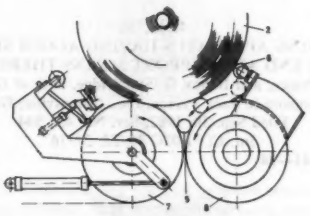
**Filed Mar. 2, 1977, Ser. No. 773,400**

**Claims priority, application Finland, Mar. 12, 1976, 760642**

**The portion of the term of this patent subsequent to Mar. 14, 1996, has been disclaimed.**

**Int. Cl.³ B65H** *17/12, 19/26*

**U.S. Cl. 242—56 R** **10 Claims**



1. In the method of winding a web into a roll upon a core and in which the web roll is supported by two parallel rotatable drums in adjacent spaced-apart relation to each other, and the infed web passes about one of the drums upwardly through the space between said drums and onto the web roll upon said drums, the improvement which comprises the steps of pushing the web roll laterally in one direction into a position in which the web roll contacts one of said drums and does not contact the other drum but defines therewith a first clearance passage; moving through said first clearance passage a new core until same is positioned in the space between said drums; pushing the web roll laterally in the opposite direction into a position in which the web roll contacts said other drum and does not contact said one drum but defines therewith a second clearance passage; positioning the infed web against the new core; moving a fastener applying means through said second clearance passage into engagement with the infed web against the new core; operating said fastener applying means to apply at least one fastener connecting the infed web to the new core; moving a cutter through said second clearance passage into engagement with the infed web to sever same between the connection thereof to the new core and said web roll; and removing said web roll to accommodate winding of the web upon the new core.

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**4,516,736**

## METHOD AND APPARATUS FOR SLITTING METAL STRIP

**Poul Andersen, Wallingford, Conn., assignor to Allegheny Ludlum Steel Corporation, Pittsburgh, Pa.**

**Filed Nov. 8, 1982, Ser. No. 440,151**

**Int. Cl.³ B65H** *35/02*

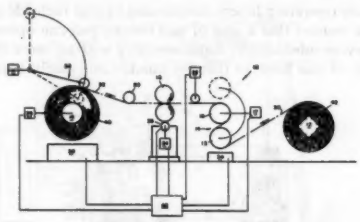
**U.S. Cl. 242—56.2** **8 Claims**

1. An apparatus for longitudinally slitting metal strip comprising:

(a) driven roll means for frictionally engaging and forwarding the strip, said means controlling the speed of the strip through the apparatus;

(b) means for driving said driven roll means;

(c) means for slitting the strip under tension, said means located after the driven roll means;
(d) means for driving said slitting means;
(e) take-up winder means for winding coils of slit metal strip thereon;
(f) means for driving said take-up winder means;
(g) means for separately measuring the speed of the slitting means, driven roll means and take-up winder means and the speed of the strip before the slitting means; and
(h) means for controlling the speed of the strip and slitting means separately from the take-up winder means and



driven roll means for providing a predetermined speed of the strip as it passes through said slitting means under tension,

said controlling means includes having the means for driving the take-up winder means speed-slaved from the driven roll means, and said controlling means includes having the means for measuring the strip speed in communication with the means for measuring the speed of the slitting means for separately comparing the strip speed and speed of said slitting means and adjusting the speed of the slitting means as a function of the comparison.

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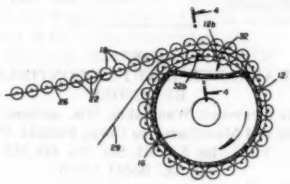
**4,516,737**

## STORAGE REEL WITH PERIPHERAL CORE RELIEF

**William F. Gliwa, Alsip, and Robert F. Kalina, Lombard, both of Ill., assignors to AT&T Technologies, Inc., New York, N.Y.**

**Filed May 27, 1983, Ser. No. 499,072**
**Int. Cl.³ B65H *75/28*; B21B *41/08***
**U.S. Cl. 242—77** **4 Claims**



1. A bandoliered package of cylindrical electrical components, each of the components having a pair of oppositely extending axial leads, which comprises:

a cylindrical core having a peripheral relief of a depth greater than one-half the diameter of the cylindrical electrical component and a width greater than the length of electrical component, said relief having peripheral length exceeding the length of a predetermined number of the electrical components spaced apart by predetermined uniform distances;

said core having unrelieved sections adjacent said relief of lengths exceeding the length of the leads projecting from the electrical components;

a pair of adhesive coated strip means adhered to the axially extending leads of the components to provide a bandolier of electrical components which are spaced apart by said predetermined uniform distances, said bandolier convoluted about said core with a leading inner convoluted section consisting of said predetermined number of said bandolier electrical components received in said relief; and

said bandoliered leads projecting from the components within said relief to rest on and be supported against bending by said unrelieved sections of said core.

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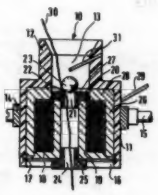
**4,516,738**

## THREAD-BRAKING DEVICE FOR A TEXTILE MACHINE

**Siegfried Nürk, Albstadt, Fed. Rep. of Germany, assignor to Sipra, Patententwicklungs-und Beteiligungsgegesellschaft gmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Oct. 20, 1983, Ser. No. 543,998**
**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1982, 3239495**
**Int. Cl.³ B65H *59/22***
**U.S. Cl. 242—152.1** **7 Claims**



1. A thread-braking device for textile threads, comprising an axially symmetrical outer housing open at two ends thereof and having a through passage for passing a textile thread therethrough; and an axially symmetrical thread brake insert releasably insertable into said outer housing and including a cup-shaped casing of magnetizable material which is surrounded by said outer housing, a ball of magnetizable material, a ring-shaped ball seat-forming element of non-magnetizable material and forming a brake surface at which a thread is braked by said ball, said cup-shaped casing receiving said ball seat-forming element concentrically with the casing, and an electromagnetic spool concentrically positioned in said cup-shaped casing, said casing having means of magnetizable material forming a pole shoe for said spool, whereby a magnetic force is exerted on said ball which can be adjusted by adjusting a current applied to said electromagnetic spool.

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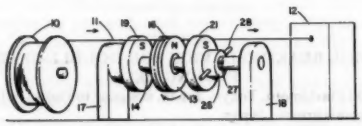
**4,516,739**

## MAGNETICALLY CONTROLLED WIRE TENSIONING DEVICE

**Kenneth L. Wyatt, Oklahoma City, Okla., assignor to AT&T Technologies, Inc., New York, N.Y.**

**Filed Mar. 30, 1984, Ser. No. 595,135**
**Int. Cl.³ B65H *59/16***
**U.S. Cl. 242—155 M** **18 Claims**



1. A device for tensioning strand advancing between a supply reel and a utilization device, which comprises:

a shaft;

a sheave rotatably mounted on said shaft for receiving a

wrap of strand, said sheave being magnetized to present opposite magnetic poles on opposite sides thereof;

a pair of discs movably mounted on said shaft with said sheave positioned therebetween, said discs being magnetized to present like magnetic poles to the magnetic poles of said sheave and to cause repelling magnetic fields therebetween; and

means for moving at least one of said discs toward and away from said sheave to vary a drag effect resulting from the repelling magnetic fields between the discs and the sheave thereby adjusting the tension on said wrap of strand.

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**4,516,740**

## TAPE DRIVING CONTROL APPARATUS

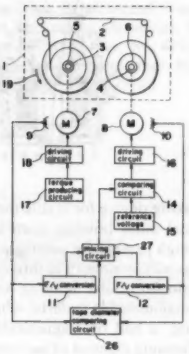
**Tadashi Yoshino, Neyagawa, and Masayuki Mamei, Takatsuki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Oct. 18, 1983, Ser. No. 543,451**

**Claims priority, application Japan, Oct. 21, 1982, 57-185660; Mar. 23, 1983, 58-49234**

**Int. Cl.³ G03B *1/04*; G11B *15/32***

**U.S. Cl. 242—203** **4 Claims**



1. A tape driving control apparatus comprising a feed reel stand, a winding reel stand, a rotational speed information detecting means for detecting the rotational speed information in accordance with the respective rotational speed of the feed reel stand and the winding reel stand, a mixing circuit for adding, as voltages, the rotational speed information from both of said rotational speed information detecting means, a means for comparing the outputs of the mixing means with reference signals, a controlling means for controlling the rotational speed of a winding reel motor driving said winding reel stand in accordance with the comparison output, a tape-winding-diameter detecting means for detecting that at least the tape-winding-diameter of said winding reel is a given diameter or less with the use of the rotational speed information from both of said rotational speed information detecting means, and a speed varying means for varying either the output of said mixing circuit or the reference signal by the output of the tape-winding-diameter detecting means.

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**4,516,741**

## SPOOL BRAKING DEVICE FOR DOUBLE-BEARING FISHING REEL

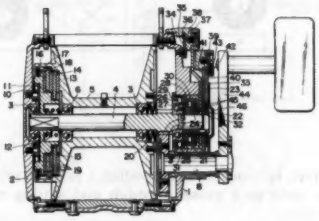
**Hiroshi Hashimoto, Tokyo, Japan, assignor to Daiwa Seiko Inc., Higashikurume, Japan**

**Filed Dec. 27, 1982, Ser. No. 452,960**

**Int. Cl.³ A01K *89/02***

**U.S. Cl. 242—217** **6 Claims**

1. A fishing reel comprising a pair of reel side plates, a spool shaft and bearing means to mount said spool shaft on said pair of reel side plates for rotational motion around its axis and for axial motion along its axis, a spool and means to mount said spool on said spool shaft, friction transmission means interconnecting said spool and said spool shaft, means for adjusting the friction force provided by said friction transmission means, said means for adjusting said friction force comprising fine and coarse adjustment means, said fine and coarse adjustment means being substantially separated from each other and each including a separate operating lever and separate cam means, both of said fine and coarse adjustment cam means being arranged for cooperation with said spool shaft to move said spool shaft axially to in turn control the friction force provided by said friction transmission means, means to mount said two separate operating levers outside one of said reel side plates in such a manner that a user of said fishing reel can operate both said levers substantially simultaneously with no more than two fingers of one hand to thereby quickly and easily adjust both



said fine and coarse adjustment means substantially simultaneously, each of said fine and coarse cam means comprising a cam surface and said fine and coarse cam means cam surfaces being so configured that substantially equal motions of said two levers will produce a substantially larger axial translation of said spool shaft under the control of said coarse adjustment cam means that the relatively smaller amount of axial translation of said axial spool shaft produced by said fine adjustment cam means;

each of said fine and coarse adjustment means comprising a separate cylinder-like member, each of said cylinder-like members being formed with one of said fine and coarse cam surfaces, and said cylinder-like members being mounted in nested arrangement at one end of said spool shaft with both said cam surfaces being operative to urge said bearing means at said one end of said spool shaft in an axial direction.

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**4,516,742**

## TURRET ARRANGEMENT FOR CONTINUOUS WEB REWINDER

**Ellsworth D. Townsend, Wausaukee, Wis., assignor to Industrial Engraving and Manufacturing Corp., Pulaski, Wis.**

**Filed May 5, 1983, Ser. No. 491,935**

**Int. Cl.³ B65H *19/06***

**U.S. Cl. 242—64** **8 Claims**

1. In an automatic continuous web rewinding machine of the type comprising a frame, an apron pivotably mounted to the frame, a mandrel spider pivotably mounted to the apron, a plurality of mandrels mounted to the spider, means for indexing a geneva cam, and a bedroll mounted adjacent the mandrels to pass a web to a core mounted on one of the mandrels when said one of the mandrels is in a take-up position, the improvement comprising:

means for locking the apron in place with respect to the frame to prevent pivotal movement therebetween;

a geneva cam which defines an array of elongated mounting slots;

a hub secured rigidly to the spider by a first plurality of fasteners;

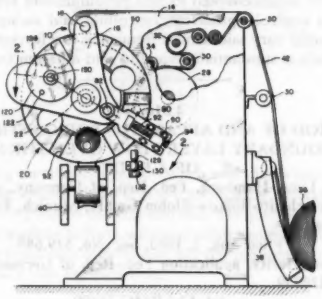
fastener means for securing the geneva cam to the hub such that the angular position of the geneva cam with respect to the hub is adjustable, said fastener means comprising a

second plurality of fasteners, each of which extends through a respective one of the mounting slots;

said geneva cam positioned to be indexed by the indexing means such that the take-up position is within the range of three degrees above to four degrees below a horizontal line passing through the center of the bedroll;

a timing plate secured to the indexing means to move with the indexing means, said timing plate defining a timing hole;

means for defining a timing opening in the apron adjacent



the timing plate, said timing hole and opening situated such that they are in alignment when the geneva cam is in alignment with respect to the apron;

a timing pin sized to fit through the timing hole into the timing opening to hold the geneva cam in alignment during cam adjustment;

a bracket mounted to the frame to hold the timing pin; and

a switch mounted to the frame in alignment with the bracket such that the switch is actuated by the pin when the pin is in the bracket, said switch operative to allow operation of the machine only when the switch is actuated.

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**4,516,743**

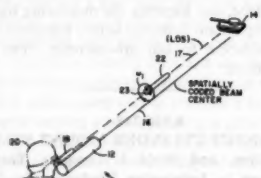
**SCANNING BEAM BEAMRIDER MISSILE GUIDANCE SYSTEM**

**Donald W. Sweeney, Livermore, Calif.; Neal C. Gallagher, West Lafayette, Ind., and Charles R. Christensen, Athens, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 18, 1983, Ser. No. 486,127**

**Int. Cl.³ F41G 7/26**

**U.S. Cl. 244—3.13** **8 Claims**




1. In a beamrider missile guidance system wherein a target is tracked by line-of-sight from a tracking station and a missile is directed toward the target substantially along the line-of-sight axis, a method of directing the missile toward the target and comprising the steps of:

visually tracking a target from a target tracking station,

directing a laser beam of optical energy from said target tracking station toward said target and along a path offset a constantly varying distance from said line-of-sight;

directing a missile toward said target within the path of said optical energy beam; and

generating correctional guidance within the missile in response to the position of said missile away from the line-of-sight and within said beam.

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**4,516,744**

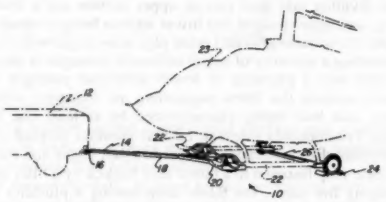
**HELICOPTER DOLLY**

**Donald L. Burnside, 6312 Caballero, Coral Gables, Fla. 33152**

**Filed Nov. 23, 1982, Ser. No. 444,196**

**Int. Cl.³ B64F 1/04**

**U.S. Cl. 244—17.17** **24 Claims**



1. A ground handling system for a helicopter equipped with two opposed, landing skids, comprising:

a front support means for retaining the front portion of the two skids of the helicopter and for supporting the weight of the helicopter on the front portion of the two skids, said front support means connectable to a propulsion means for towing said front support means; and

a means connected to said front support means for maneuvering said front support means,

said means includes a front wheel assembly means connected to said front support means for turning and maneuvering said front support mans, and for supporting said front support means out of ground contact to provide clearance between the helicopter and said front support means,

said front support means includes an elongated framework assembly connected to said wheel assembly means, said framework assembly having a first skid retaining means connected thereto for cradling the front portion of the skids and accomodating varying width between skid tubes, and said front wheel assembly means connected to said framework assembly includes a suspended wheel means in contact with the ground, said first skid retainer means includes a tray means for supporting the underside of the skids and a skid latch cover means for containing the skids,

a rear wheel assembly means connected to the rear portion of the skids for supporting the weight of the helicopter on the rear portion of the skids and for transporting the helicopter,

said wheel means includes at least one wheel connected to said front wheel assembly adjacent to each end of said framework assembly, said whel having a locking means for securing said wheel in a fixed position for control during rearward movement of said front support means,

said rear wheel assembly means includes at least two wheels and an axle assembly,

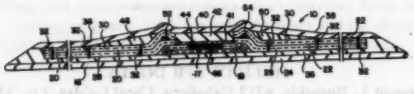
said axle assembly includes a skid retaining means connected to said axle for cradling the rear portion of the skids and accomodating varying width between skid tubes, said skid retaining means includes a tray means for supporting the underside of the skids and a skid latch cover means for containing the skids.

4,516,745

## PNEUMATIC DEICER AND DEICING METHOD

Duain N. Ely, Uniontown, and Joseph H. Macarchenia, Tallmadge, both of Ohio, assignors to B. F. Goodrich Company, New York, N.Y.

Filed Sep. 30, 1982, Ser. No. 431,952
Int. Cl.³ B64D 15/18
U.S. Cl. 244—134 A 6 Claims



1. A pneumatically inflatable deicer boot for mounting on an airfoil, said boot having a leading edge centerline, said centerline dividing said boot into an upper section and a lower section, said upper section and lower section being formed of two piece fabric outer plys and inner plys sewn to provide a carcass providing a plurality of upper inflatable passages in said upper section and a plurality of lower inflatable passages in said lower section, the fabric supporting air transport within the boot, said boot being characterized by at least one leading edge, continuously integral, tubular member formed of resilient rubberlike material with spaced apart edges and including a fabric strip fastened to a fabric tape backed by a filler member bridging the edges, the fabric strip having a plurality of stiff fibers defining a channel; the tubular member being positioned in the area of said leading edge centerline; and means to substantially inflate said leading edge tubular member and thence operative to inflate said upper and lower inflatable passages while maintaining substantial inflation of said leading edge tubular member for cracking of ice formed on the outside surface of said boot at said leading edge centerline whereby the ejection of ice covering said upper and lower sections of said boot is facilitated.

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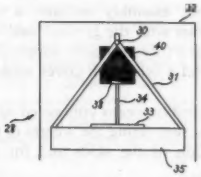
4,516,746

## NUTATION DAMPER SYSTEM COMPRISING A CONTROL MEMBER FOR VARYING A NATURAL FREQUENCY OF A PENDULUM

Susumu Takezawa; Ken'ichi Ikebe; Haruki Ayada; Tatsuyuki Fukui, and Munenori Okada, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Apr. 8, 1983, Ser. No. 482,970
Claims priority, application Japan, Apr. 9, 1982, 57-58322
Int. Cl.³ B64G 1/38
U.S. Cl. 244—170 8 Claims



1. An improved nutation damper system for use in an artificial satellite having a body which may be subject to a rotation accompanied by a nutation around an axis of rotation, said body being subjected to a variable acceleration force having a component along said axis, said nutation having a nutation frequency which is dependent on a spin rate and a moment of inertia associated with said satellite, said nutation damper system being of the type which include a damping mechanism incorporating a pendulum which swings about a fulcrum at a natural frequency in response to said nutation, said damping mechanism acting through said pendulum to dampen said nutation, the improvement wherein said system further comprises:

acceleration component detecting means for detecting said component and for producing an acceleration signal representative of said component;

calculating means responsive to said acceleration signal for calculating said nutation frequency from said component to produce a nutation signal representative of said nutation frequency;

control signal producing means responsive to said nutation signal for producing a control signal dependent on said nutation frequency; and

control means coupled to said pendulum and responsive to said control signal for controlling said swinging movement to vary said natural frequency to a forced frequency which is substantially equal to said nutation frequency.

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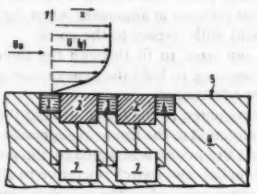
4,516,747

## METHOD OF AND APPARATUS FOR CONTROLLING THE BOUNDARY LAYER FLOW OVER THE SURFACE OF A BODY

Werner Lurz, Hamburg, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 2, 1983, Ser. No. 519,689
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1982, 3228939
Int. Cl.³ B64C 23/00
U.S. Cl. 244—204 5 Claims



1. Method for controlling the flow in the boundary layer at the surface of a body cover which flow takes place, based on the active change of the original motion of flow particles in close proximity to the surface, comprising the steps of continuously measuring at least at two locations at least two of the physical values of the flow, as the frequency spectrum, the amplitudes and/or the phase position of the fluctuation velocities, directing the measured values to a control circuit, analyzing the measured values in the control circuit and determining the predominant frequency, and, based on the predominant frequency, transmitting a corresponding vibration signal to an active vibration transmitter located on the surface over which the flow takes place, and locating the measuring locations one adjacent to and upstream from the active vibration transmitter and the other adjacent to and downstream from the active vibration transmitter.

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4,516,748

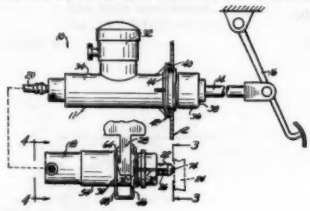
## QUICK CONNECT CYLINDER MOUNT STUCTURE

Richard Nix, Utica, and David J. Compton, Troy, both of Mich., assignors to Automotive Products, plc, Leamington Spa, England

Filed Jun. 10, 1982, Ser. No. 387,017
Int. Cl.³ A47G 29/00
U.S. Cl. 248—1 5 Claims

1. A mounting structure for coupling a housing to a support member, said support member comprising a bifurcated portion having a pair of substantially spaced apart lug members, said structure comprising a generally U-shaped clip member having a frontal wall and a pair of springingly deflectable legs spaced apart from said frontal wall and extending substantially parallel

thereto, and opening in said frontal wall encircling said housing, a step-like abutment on each of said lug members, corresponding abutment means on each of said deflectable legs of said clip, and inclined surface means springingly causing deflection of said clip legs for passage over said step-like abutment on each said lug members during introduction of said clip



over said lug members, whereby when said clip is introduced over said lug members said legs are springingly deflected and snap back to a position causing said step-like abutment on each of said leg members to form with said abutment means on each of said legs a one-way interference preventing removal of said clip from over said lug members.

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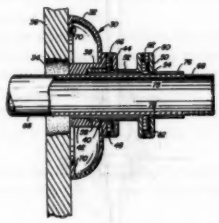
**4,516,749**

## MECHANICAL STABILIZER

**William B. Sullivan, 1609 E. Butler Dr., Phoenix, Ariz. 85020**

**Filed May 6, 1983, Ser. No. 492,204**
**Int. Cl.³ F16L *5/00***
**U.S. Cl. 248—56** **6 Claims**



1. A stabilizer for securing a generally cylindrical member at one side of a surface generally perpendicular with respect to said cylindrical member and attachable from one side of said surface, said stabilizer comprising:

(a) a canopy having a hub with first and second ends, said hub defining a generally axial bore and first adjustment means associated with said bore at said first end, the said canopy extending radially outward and terminating at a location in substantially the same plane as the terminus of the hub at said second end to provide a bearing surface;

(b) an adapter having a body defining a generally axial bore and axially slidable along said member, said adapter having second adjustment means adapted to engage said first adjustment means of said canopy;

(c) first securement means associated with said canopy; and

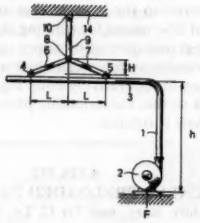
(d) second securement means associated with said adapter whereby the canopy and adapter are slidable about said cylindrical member at said first side and engageable at said first and second adjustment means with the second end of said canopy engaging said surface with said second securement means engaging said member and thereafter permitting said canopy to be adjusted to the desired position relative to said member and surface and secured in said position at said first securement means.

**4,516,750**

## MEANS FOR SUSPENDING PIPEWORK

**Alfred Brunner, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Dec. 29, 1981, Ser. No. 335,455**
**Claims priority, application Switzerland, Jan. 8, 1981, 83/81**
**Int. Cl.³ F16L *3/00***
**U.S. Cl. 248—58** **4 Claims**



1. In combination,

a piping system having a horizontal portion and a second portion fixed at a point in a horizontal plane vertically spaced from said horizontal portion;

a first means pivotally secured to said horizontal portion at two spaced apart positions of said horizontal portion, said first means including a pair of links, each link being pivotally connected at one end to a respective position of said horizontal portion and to each other at an opposite end; and

a vertically disposed support member pivotally connected to each link at said opposite ends thereof for supporting said first means at a mid-point of said first means for suspension of said horizontal portion.

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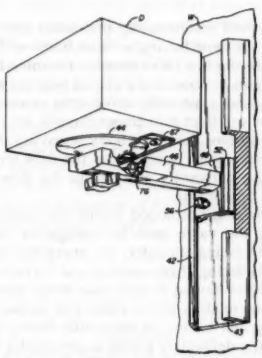
**4,516,751**

## WALL BRACKET SYSTEM

**Charles Westbrook, 182 Flying Mist Isle, Foster City, Calif. 94404**

**Filed Sep. 17, 1982, Ser. No. 419,349**
**Int. Cl.³ E04G *3/00***
**U.S. Cl. 248—276** **11 Claims**



1. A wall bracket system for vertically adjustably mounting a device on a vertical surface, said system comprising:

a channel defining a generally linear path and having means for securing to the vertical surface;

a bracket arm having means at one end for slidably engaging the channel so that said arm is capable of translating along the path, and further having a socket spaced inward from said one end;

a mounting plate having a generally spherical bearing surface including a radial slot, said bearing surface being received within the socket of the bracket arm so that said mounting plate is simultaneously capable of rotating about an axis which is generally parallel to the vertical path and tilting relative to said axis; and

means for retaining the mounting plate within the socket and for tilting the mounting plate relative to the vertical axis, said means for retaining including a threaded shaft rotatably secured to the bracket arm and projecting through the radial slot; means for rotating the shaft; a block having a threaded passage and mounted on the threaded shaft so that it translates along said shaft as said shaft is rotated; and means for operatively coupling the mounting plate to the block so that the mounting plate tilts within the socket as the shaft is rotated.

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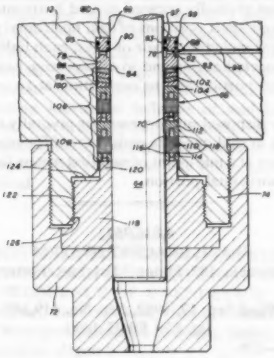
**4,516,752**

## MECHANICALLY PRELOADED PACKING ASSEMBLY

**Brett A. Babbitt, Katy, and Tri C. Le, Missouri City, both of Tex., assignors to Joy Manufacturing Company, Pittsburgh, Pa.**

**Filed Jan. 12, 1984, Ser. No. 570,110**
**Int. Cl.[3] F16K *31/44*; F16J *15/00***
**U.S. Cl. 251—214** **6 Claims**



1. An improved mechanically preloaded packing assembly in a valve of the type having a valve body with a fluid flow passage therethrough, a valve member mounted for movement between an open position and a closed position relative to the flow passage, and a movable valve stem connected with the valve member to effect movement thereof between the open and closed positions, the valve body receiving the valve stem and defining an annular space about the stem terminating in a shoulder facing outwardly away from the flow passage, the improvement comprising:

an energizer ring positioned within the annular space surrounding the valve stem in contiguous relation to the outwardly facing shoulder, the energizer ring having an outwardly facing frusto-conical end surface;

a spring means having at least one metal spring washer in contiguous relation to the other end surface of the energizer ring and having an outwardly facing frusto-conical shape being defined by a cone angle smaller than the cone angle of the energizer ring end surface;

a packing ring means positioned within the annular space arranged in contiguous relation to the spring washer and disposed closely around the stem to effect a high pressure seal between the stem and the valve body; and

a packing gland nut disposed in contiguous relation to the outer end of the packing ring means, the packing gland nut being provided with external threads for accommodating its connection with an internally threaded section of the valve body, the packing gland nut being axially adjustable within the annular space of the valve body for applying an axial force on the packing ring means and spring means until the cone angle of the spring washer matches the cone angle of the energizer ring whereby the spring means applies a predetermined load unto the packing ring means such that the packing ring means is sufficiently preloaded to effect a low pressure seal between the stem and valve body.

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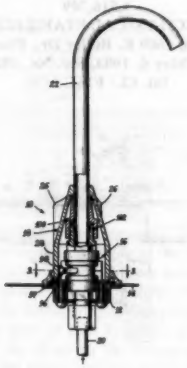
**4,516,753**

## FAUCET DEVICE WITH REPLACEABLE VALVE CARTRIDGE

**Jack W. Thomsen, 921 N. Stone Ave., LaGrange, Ill. 60525**

**Filed Jun. 15, 1983, Ser. No. 504,670**
**Int. Cl.[3] F16K *31/00***
**U.S. Cl. 251—346** **32 Claims**



1. A faucet device adapted to be connected to a liquid inlet line comprising:

faucet mounting means;

an in-line valve including a valve body having inlet and outlet ports at opposite ends of said valve, said inlet being connectable to a liquid inlet line and said outlet being connectable to a discharge pipe;

a sleeve valve member disposed in said valve body for axial movement therein including a plug valve member mounted centrally within said sleeve valve member;

means defining a pair of axially extending annular channels disposed within and at opposite ends of said valve body, said channels providing recesses for supporting said sleeve valve member therein;

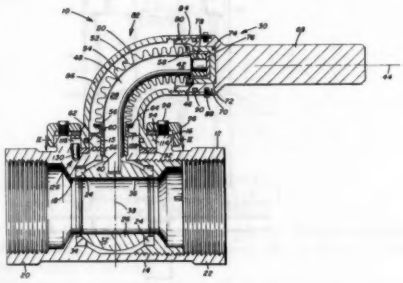
combination valve seat and seal means attached to the inner end of at least one of said inlet and outlet ports, said seal means being disposed so as to form a seal between said sleeve valve member and the inner end of said inlet or outlet; and

means associated with said valve body for opening and closing said faucet including means for effecting axial movement of said sleeve valve member in said valve body to seat and unseat said plug valve.

## 4,516,754
## BENT BELLOWS SEALED ROTARY VALVE

James R. Owoc, Pittsburgh, Pa., assignor to Kerotest Manufacturing Corp., Pittsburgh, Pa.

Continuation of Ser. No. 357,258, Mar. 11, 1982, Pat. No. 4,452,246. This application May 14, 1984, Ser. No. 609,867
The portion of the term of this patent subsequent to Jun. 5, 2001, has been disclaimed.
Int. Cl.³ F16K 41/10
U.S. Cl. 251—335 B 11 Claims



1. An actuating device for movement of a member mounted in an enclosure comprising,

actuating means rotatable in an orbital path about a first axis for moving said member,

a stem extending between said member and said actuating means,

said stem having a lower end portion aligned with said first axis and connected to said member for rotation with said member about said first axis,

said stem having an upper end portion aligned with a second axis and connected to said actuating means,

a bearing assembly retained in said actuating means for supporting said stem upper end portion,

an internally pressurized bellows surrounding said stem, said bellows having a lower end portion and an upper end portion,

a primary pressure boundary formed by said bellows around said stem to prevent the escape of fluid through said bellows,

said primary pressure boundary at said bellows lower end portion including a bellows plate surrounding said stem lower end portion and sealingly connected to said enclosure, said bellows lower end portion being welded to said bellows plate to form a hermetic seal around said stem lower end portion,

said primary pressure boundary at said bellows upper end portion including a bellows cap received within said actuating means and surrounding said stem upper end portion to permit rotation of said bellows cap relative to said stem upper end portion, said bellows upper end portion being welded to said bellows cap to form a hermetic seal around said stem upper end portion,

a secondary pressure boundary surrounding said bellows to back up said primary pressure boundary and prevent the escape of any fluid from said primary pressure boundary to the surrounding atmosphere,

said secondary pressure boundary including said actuating means and a rotatable housing connected in surrounding relation with said bellows at an upper end to said actuating means and at a lower end of said enclosure,

said housing having a configuration corresponding to the configuration of said bellows and said stem,

said housing upper end being sealingly connected to said actuating means to rotate with said actuating means, and

said housing lower end being rotatably positioned on and sealingly connected to said enclosure to permit said housing to rotate about said first axis upon movement of said member.

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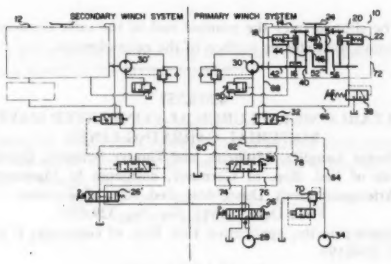
## 4,516,755
## HYDRAULIC WINCH CONTROL SYSTEM

Toshio Uchimura, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jun. 2, 1982, Ser. No. 384,414
Int. Cl.³ B66D 1/00, 1/30
U.S. Cl. 254—344 4 Claims




1. A hydraulic control system for a reversible hoisting winch, wherein the winch has a spooling drum driven by a bidirectional hydraulic motor via planetary drive means including a brake which is responsive to fluid pressure actuation to allow the drum to freewheel, the control system comprising:

(a) a first source means of hydraulic fluid under pressure;

(b) a motor control valve for controlling communication between the first pressurized fluid source means and the bidirectional hydraulic motor in order to set the motor into and out of rotation in either of opposite directions;

(c) a second source means of hydraulic fluid under pressure for supplying pressurized fluid for lubrication purposes when the hydraulic motor is in rotation in either direction, and for conditioning the spooling drum for freewheeling when the motor control valve is in neutral;

(d) a pilot-operated selector valve normally positioned to cause the pressurized fluid from the second source means to be used for the actuation of the brake of the planetary drive means and responsive to a pilot signal to cause the pressurized fluid from the second source means to be used for the lubrication of the winch; and

(e) means for applying the pilot signal to the pilot-operated selector valve in response to the delivery of the pressurized fluid from the first source means to the hydraulic motor, for the actuation of the motor in either direction, via the motor control valve.

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## 4,516,756
## PLASTIC SHEATH FOR FENCING

Gary L. Beatty, 450 S. Mason St., Harrisonburg, Va. 22801

Filed Jun. 13, 1983, Ser. No. 503,620
Int. Cl.³ E04H 17/00
U.S. Cl. 256—1 4 Claims

1. A hollow fence element for use in combination with a wood core picket fence element and comprising a hollow plastic rigid tubular sheath having a length co-extensive with the length of the fence element, having a closed tapered end congruent with the pointed end of the picket and an open end,

and having interior dimensions which are congruent with the exterior dimensions of the core element such that the sheath

can be slipped over the pointed end of the core element and surround the exterior surface of the core element.

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**4,516,757**

## TILTABLE METALLURGICAL CONVERTER HAVING MATERIAL CARRYING LINES

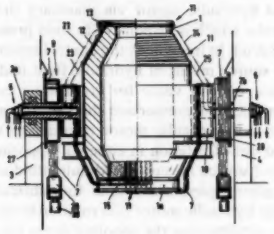
**Karlheinz Langlitz, Mulheim, and Gunter Schmitz, Duisburg, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany**

**Filed Dec. 9, 1981, Ser. No. 329,050**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1980, 3048199**

**Int. Cl.³ C21C *5/50***

**U.S. Cl. 266—245** **9 Claims**



1. A tiltable metallurgical converter comprising:

(a) a metallurgical vessel having at least one operational site;

(b) a pair of pivot pins secured to said vessel;

(c) support bearings for said pivot pins;

(d) said pivot pins and support bearings serving to allow rotation of said vessel about a horizontal axis passing through said pivot pins when said pivot pins are selectively rotated;

(e) at least one of said pivot pins being hollow;

(f) at least one material carrying line passing through the interior of said hollow pivot pins, said material carrying lines connected on its first end to a remote source of material;

(g) at least one enlarged, in diameter, portion of said hollow pivot pin, located between said support bearing of said hollow pivot pin and said vessel;

(h) at least one additional material carrying line having its first end connected to a stationary tapping point;

(i) said tapping point being connected to a second remote source of material;

(j) said additional material carrying lines being guided by at least one full turn around said enlarged, in diameter, portion of said hollow pivot pin; and

(k) the second ends of said material carrying lines and said additional material carrying lines being connected to said operational sites.

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**4,516,758**

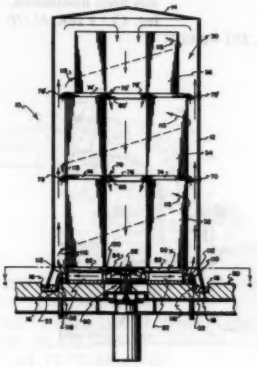
## DIFFUSER SYSTEM FOR ANNEALING FURNACE

**Gary L. Coble, 12065 Greenwick Rd., Homerville, Ohio 44234**

**Filed Jan. 10, 1983, Ser. No. 456,823**

**Int. Cl.³ F27B *5/06***

**U.S. Cl. 266—263** **9 Claims**



1. A convection diffuser and charge support system for an annealing furnace, comprising:

(a) a generally annular base structure having inner and outer portions that define substantially concentric circles that are radially spaced one from the other, the base structure being formed from at least one base structure casting, the base structure casting having as integral formations thereof a bottom wall, a top wall, a plurality of curved vane structures that extend substantially vertically between and interconnect the top and bottom walls to define an array of curved, substantially horizontally extending primary flow passage means which underlie and are shielded from above by the integrally formed top wall of the base structure casting, with the top and bottom walls of the base structure casting being of generally annular configuration when viewed from above, and with the curved primary flow passage means having inner and outer openings near the inner and outer portions of the base structure for ducting gas flows along curved, radially-outwardly-directed paths that extend from the inner opening toward the outer opening;

(b) the base structure casting also having a plurality of vane structure extensions which project upwardly from the top wall, the extensions having upper edge portions which extend in a common horizontal plane for receiving and supporting a charge of material to be annealed, which charge is generally annular in configuration when viewed from above,

(c) a base-encircling ring structure separately fromed from at least one relatively massive ring structure casting, the ring structure casting being configured and disposed to surround and closely receive peripheral portions of the base structure casting, said ring structure defining an array of curved, upwardly-opening flow passage means which cooperate with the horizontally extending primary flow passage means of the base structure casting for ducting gases that discharge from the primary flow passages and for ducting such discharged gases upwardly along generally helical paths of flow about a charge of material which is positioned atop the base structure for annealing, and,

(d) a cooling conduit within said ring structure casting for ducting cooling fluid therethrough, said conduit being disposed in said casting in non-obstructing relation to said upwardly-opening flow passage means.

4,516,759

## ROTARY PRINTING MACHINE OUTPUT SPEED MATCHING SYSTEM FOR SHEET FOLDER

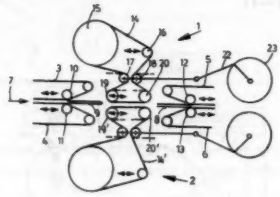
Ingo Kobler, Anhausen, Fed. Rep. of Germany, assignor to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Jun. 1, 1984, Ser. No. 616,176

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1983, 3321811

Int. Cl.[3] B41F *13/64*

U.S. Cl. 270—12 15 Claims



1. In and for combination with a paper folding apparatus receiving staggered, sequential sheets (**8**, **9**) from a rotary printing machine having

a high-speed transport system (**3**, **4**, **10**, **11**) operating at a first and high speed;

a low-speed transport system (**5**, **6**, **12**, **13**) operating at a second speed lower than said high speed;

and comprising, in accordance with the invention,

a speed matching belt system to transport the sheets between the first and second systems and decelerate the sheets from the first, high speed to the second, lower speed, including

a third system (**1**, **2**, **14**, **14'**) having belts operating at a variable speed,

said third belt system being operable at a first high speed when the leading edge of the sheet (**8**) reaches the third belt system, and then decelerating to the second and slower speed;

said third belt system then again reaccelerating to reach the first high speed when the leading edge of a subsequent sheet (**9**) reaches the third belt system;

the length of the third belt system and the transport speed of the first belt system being matched to permit respective deceleration and acceleration of the third belt system between the first and second speeds while transporting sequential sheets from the first to the second transport system.

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4,516,760

## APPARATUS FOR LAYING WEB MATERIAL

Günter O. Stumpf, Ostendstrasse 13, D-7432 Urach, Fed. Rep. of Germany

Filed Aug. 27, 1982, Ser. No. 412,262

Claims priority, application Fed. Rep. of Germany, Sep. 23, 1981, 3137876

Int. Cl.[3] B65H *29/46*

U.S. Cl. 270—31 21 Claims

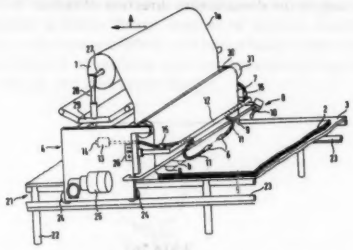
1. An apparatus for laying soft thin fabric, such as nylon, woven goods, jersey, plush weave or the like on a flat laying surface for cutting, said apparatus comprising:

(a) a laying surface for receiving layers of fabric,

(b) a laying carriage which is movable over the laying surface to deposit the fabric on the laying surface, the carriage having means to provide the fabric as a vertically suspended web from the laying carriage to the laying surface,

(c) at least one pivoting air nozzle mounted on the laying carriage at the end of a flexible air supply line for directing air in a horizontal plane at the decending web material, said pivoting nozzle being pivotal over an angular range of approximately 180°,

(d) a mounting means for suspending the nozzle behind the suspended web with respect to the travel direction of the laying carriage during the laying of the fabric.



(e) a drive means for pivoting the nozzel during the depositing travel of the laying carriage.

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4,516,761

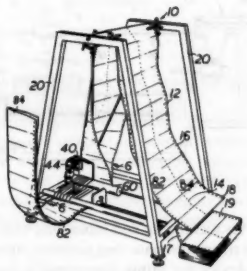
## MOTOR DRIVEN CONTINUOUS FORM FOLDER

Mario Ricciardi, Glenview, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Apr. 23, 1984, Ser. No. 602,990

Int. Cl.[3] B41L *43/04*

U.S. Cl. 270—41 12 Claims



1. A web folding device for folding an unfolded web longitudinally along a weakened fold line and wherein the web has opposite side edges, the device for use in combination with a web processing machine which draws the web from the web folding device in a downstream path of travel, the device comprising:

a frame;

an upper roller means mounted to the frame and extending horizontally across the path of travel of the unfolded web;

motor driven roller means mounted to the frame below the upper roller means and extending horizontally across the path of travel of the folded web;

a pair of fold plates mounted to the frame and disposed between the upper roller means and motor driven roller means, the fold plates defining a channel through which the web passes and is gradually folded by the fold plates contacting the surface of the web on opposite sides of the fold line;

a driven exit roller mounted to the frame and positioned downstream from the motor driven roller means;

at least one drive belt connecting the motor driven roller means to the driven exit roller, such that both rollers rotate in the same downstream direction;

whereby when the web processing machine is not drawing the web from the device the web is slack and does not tightly engage the drive belt such that the web is not driven in the downstream direction of travel, and when

the web processing machine is drawing the web from the device the web is placed in tension and frictionally engages the drive belt such that the belt aids in driving the web in the downstream direction of travel.

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**4,516,762**

## SYSTEM FOR PICKING UP AND SEPARATING BAGS FROM A PACK TO BE APPLIED TO AUTOMATIC BAG INSERTING APPARATUS

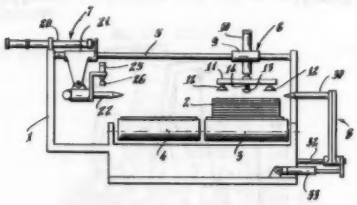
**Mario Moltrasio, and Vincenzo Perrucchini, both of Bergamo, Italy, assignors to Car-ventomatic S.p.A., Bergamo, Italy**

**Filed Jul. 19, 1982, Ser. No. 399,908**

**Claims priority, application Italy, Feb. 12, 1982, 19630 A/82**

**Int. Cl.³ B65H *5/08***

**U.S. Cl. 271—11** **3 Claims**



1. System for picking up and separating bags from a pack for feeding them to an automatic bag inserting apparatus, comprising a lifting device for lifting transversally the uppermost bag of the pack, grasping said uppermost bag at its transversal central position, where said bag can never be glued to the next underlying bag, so as to allow to insert under said uppermost bag, from each side of said uppermost bag, at least first and second devices acting under said uppermost bag and causing said uppermost bag to be unstuck from said next underlying bag, the first device being coupled to means pinching, finally separating and transferring said bags one by one and sequentially, to feeding means of said bag inserting apparatus, the second device also providing for holding the underlying bags, during final unsticking and transfer of the bag picked up from the pack, said first device for unsticking and transferring said uppermost bag comprises a body adapted to slide on a guide parallel to the bag transversal middle portion which in the forward stroke brings the unsticking unit to act under the bag, and in the return stroke moves the bag on the means for feeding the bag inserting apparatus, the unsticking unit mounted on said body comprising two bars adapted to assume a first close position for insertion under the bag, and a second open position for unsticking the bag, said two positions being obtained by causing said bars to slide along a bar transversal to the movement of said device, by means of two pistons, said first device also including a picking and transfer unit comprising two vertically movable pads by means of two pistons pinching the bag edges against said unsticking bars when they are in the open position and transfer it, during the return stroke, on the feeding means for the bag inserting apparatus, during the return stroke said unit stripping and finally separating the uppermost bag from the next underlying bag of the pack.

**4,516,763**

## METHOD AND APPARATUS FOR SINGULARIZING STACKED X-RAY FILMS OR THE LIKE

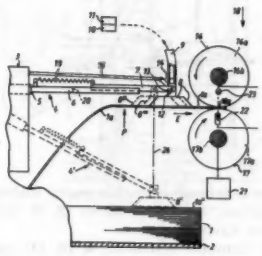
**Werner Stahl, Kirchheim-Heimstetten, and Jürgen Müller, Munich, both of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 28, 1983, Ser. No. 470,178**

**Claims priority, application Fed. Rep. of Germany, Mar. 30, 1982, 3211610**

**Int. Cl.³ B65H *5/08***

**U.S. Cl. 271—11** **21 Claims**



1. Apparatus for transferring successive outermost sheets from a stack of sheets into a predetermined plane, particularly for transferring X-ray films, comprising a source of stacked sheets; transporting means operable to advance successive sheets in a predetermined direction in said plane; and singularizing means including a mobile support, at least one suction-operated transfer element on said support, and means for moving said support between at least one first position in which said transfer element can attract the outermost sheet in said source and a plurality of second positions in some of which said transfer element maintains at least a portion of the thus attracted sheet in said plane, said transporting means including means for engaging and advancing said sheet portion in said predetermined direction in said plane in at least one second position of said support to thereby entrain said transfer element in said predetermined direction while transfer element continues to adhere to the sheet, said moving means including means for yieldably opposing such entrainment of said transfer element in said predetermined direction.

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**4,516,764**

## PAPER FEEDING DEVICE

**Takashi Tamura, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Nov. 18, 1982, Ser. No. 442,510**

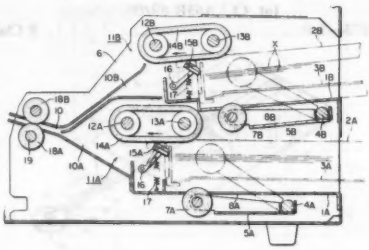
**Claims priority, application Japan, Nov. 30, 1981, 56-192300**

**Int. Cl.³ B65H *3/04***

**U.S. Cl. 271—34** **1 Claim**

1. In a paper feeding device comprising a paper feeding member for feeding out paper from a cassette inserted on a stand, a driving system for driving the paper feeding member upon a paper feeding command, and a lifting member for lifting papers loaded on a bottom plate of the cassette against the paper feeding member during a paper feeding operation, the improvement comprising a first spring clutch and a locking member deterring said first spring clutch which are incorporated in said driving system for driving the paper feeding member upon a paper feeding command, a lift-operating member coupled with said locking member for operating said lifting meber upon said paper feeding command, an energizing member connected between said lift-operating member and said lifting member for applying a lifting force to said lifting member only upon activation of said lift-operating member, and a second spring clutch engaged with said driving system for applying rotational movement to said lift-operating member

when said driving system is operated upon a paper feeding command, said lift-operating member being moved to a non-



operating position and said energizing member being deenergized during the period when a paper feeding command is not in effect.

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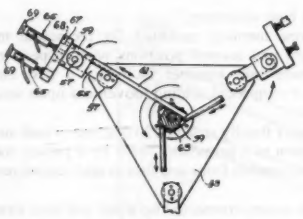
**4,516,765**

## ROTARY PICK AND PLACEMENT MACHINE

**Sam Stocco, Brooklyn Park, and Stanley Davis, Maple Grove, both of Minn., assignors to Thiele Engineering Company, Minneapolis, Minn.**

**Filed Nov. 15, 1982, Ser. No. 441,781**
**Int. Cl.³ B65H *3/12***
**U.S. Cl. 271—95** **4 Claims**



1. A pick and placement machine comprising a drive shaft, a radially extending rod on said drive shaft movable inwardly and outwardly relative to said drive shaft, a continuously rotating crank connected to the outer end of said rod and journalled outwardly of said drive shaft, the crank effecting inward and outward movement of said rod, suction means on the outer end of said rod, and means connected between said drive shaft and said crank to effect rotation therof.

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**4,516,766**

## RESILIENT SUPPORT FOR PLAYGROUND SEAT

**Wesley D. Sutton, Jr., Fort Payne, Ala., assignor to Game Time, Inc., Fort Payne, Ala.**

**Continuation of Ser. No. 469,804, Feb. 25, 1983, abandoned. This application Jul. 11, 1984, Ser. No. 628,968**
**Int. Cl.³ A63G *17/00***
**U.S. Cl. 272—52** **17 Claims**

1. A rocking seat for children's amusement positionable on a support surface comprising:

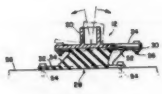
a seat assembly adapted to seat a child,

an upright means comprising a generally vertically disposed pole having an upper end secured to said seat assembly and having a lower end,

a body of resilient material having an upper surface, positioned generally below said seat assembly, and supporting said seat assembly,

a retaining means for retaining and securing said lower end on and generally above said upper surface of said body of resilient material,

said body of resilient material including an upper flange formed of resilient material to which said retaining means is attached, a lower flange formed of resilient material parallel to and spaced below said upper flange, and a web portion formed of resilient material interconnecting said upper flange and said lower flange,



a securing means for securing said lower flange of resilient material to the support surface, and

said body being configured to enhance the rocking motion between said lower end and the support surface as a child seated in said seat assembly shifts his weight forwardly and rearwardly and side to side, and said body of resilient material including a forward overhanging portion formed of resilient material and adapted to enhance said rocking motion.

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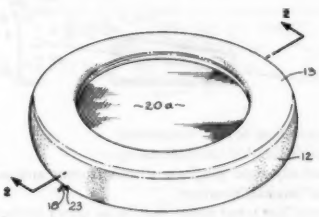
**4,516,767**

## INFLATABLE PLATFORM FOR REPETITIVE BOUNCING

**Luther Eskijian, 2223 Midlothian Dr., Altadena, Calif. 91001**

**Filed Aug. 9, 1982, Ser. No. 406,269**
**Int. Cl.³ A47C *27/08;* A63B *5/00***
**U.S. Cl. 272—65** **2 Claims**



1. Apparatus for use in repetitive bouncing to improve blood and lymphatic solution circulation, the apparatus comprising

(a) an inflated platform, that consists of flexible elastomeric material defining a hollow interior in which pressurized gas is received,

(b) the platform having a central upper wall and there being a reinforced layer on said upper wall on which to stand, during bouncing, the platform having an annular top wal

at substantially higher level than said layer, and a bottom wall beneath said upper wall,

(c) the platform having a side wall which integrally merges with said top and bottom walls, and which is reinforced to resist outward expansion during bouncing, the annular top wall merging with said central upper wall,

(d) said side wall being everywhere openly and unobstructedly exposed to all of said hollow interior below said upper central wall and above said bottom wall, and also below said annular top wall,

(e) there being a flat reinforcement layer on and covering said central upper wall,

(f) the platform being deflectible and frameless, the platform defining an upwardly opening recess immediately above said upper layer, the depth of said hollow interior below said central wall being sufficient to prevent bottoming of said wall during bouncing,

(g) the platform annular side wall having associated glass fiber reinforcement, the thickness of said side wall and reinforcement substantially exceeding the thickness of each said top and bottom walls, and a gas fill valve in said side wall near said bottom wall.

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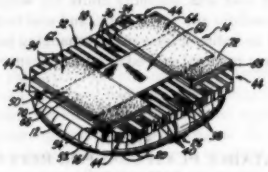
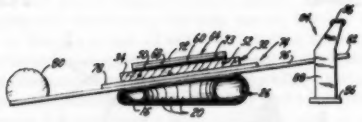
**4,516,768**

## EXERCISE DEVICE

**Carmelo Gallaro, 490 Henry St., Brooklyn, N.Y. 11231**

**Filed Sep. 27, 1982, Ser. No. 424,079**
**Int. Cl.³ A63B** *5/00, 23/02*
**U.S. Cl. 272—65** **21 Claims**





1. An exercising device comprising:

an inflatable flexible toroidal member;

a substantially rigid platform disposed over and supported by said toroidal member;

at least one foot tread positioned on an upper surface of said platform;

said platform including flexing means for permitting flexing of one section of said platform relative to another section thereof, said platform including a plurality of elongated rigid slats having upper and lower surfaces;

said flexing means including resilient spacers secured between adjacent slats; and

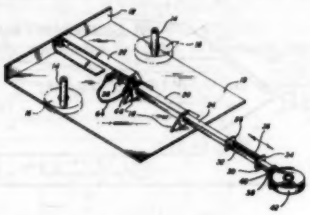
said upper and lower surfaces of said slats respectively lying in parallel planes, said upper surfaces of said slats defining said upper surface of said platform.

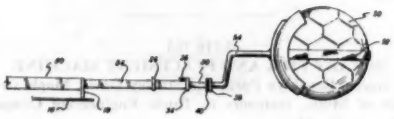
**4,516,769**

## REBOUND SPORTS TRAINING APPARATUS

**Harold W. Kopp, 137 Daytona Ave., Narragansett, R.I. 02882**

**Filed Mar. 12, 1984, Ser. No. 588,288**
**Int. Cl.³ A63B** *69/00*
**U.S. Cl. 273—1 B** **9 Claims**





1. Apparatus for training a player in sports involving the forceful projection of a game object, said apparatus comprising:

(a) stationary base structure;

(b) at least one member mounted for reciprocal motion between first and second positions with respect to said base structure said member including a first element mounted for reciprocal, sliding movement upon said base structure;

(c) a game object fixedly attached to one end of said member for application of a propelling force by a player, thereby moving said member from said first to said second position thereof;

(d) stretchable means connected between said base structure and said member for movement from a normally contracted to a flexed condition as said member is moved from said first to said second position thereof, whereby movement of said stretchable means back to said contracted position returns said member to said first position thereof and;

(e) a second element mounted for reciprocal, sliding movement upon said first element and movable therewith between said first and second positions.

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**4,516,770**

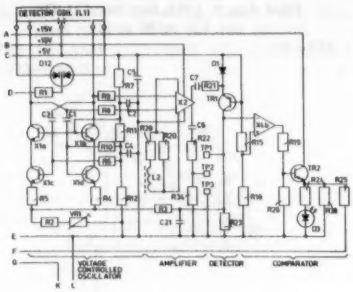
## BALL IDENTIFICATION FOR A TABLE BALL GAME

**David L. Brookes; John D. Weatherly, and Colin R. Dillicar, all of Auckland, New Zealand, assignors to Development Finance Corporation of New Zealand, Auckland, New Zealand**

**Filed Dec. 23, 1982, Ser. No. 452,729**
**Int. Cl.³ A63D** *15/00*
**U.S. Cl. 273—11 R** **7 Claims**

1. A table ball game having a playing surface and ball traps, electronic detection means associated with one or more of the ball traps, a plurality of balls having identification means associated therewith, said identification means comprising at least one resonant circuit in each said ball, said at least one circuit in each said ball being tuned to resonate at a different frequency than at least one said circuit in each of the other said balls, said at least one circuit of each said ball being capable of being individually detected by said electronic detection means, said electronic detection means being coupled to scoring means to record the entry of balls into said ball traps, the electronic

detection means comprising plural coils or a single coil with taps in a complex pattern, either of these coil means arranged



to generate a complex field having a plurality of orthogonal axes, and means for detecting perturbations in said field.

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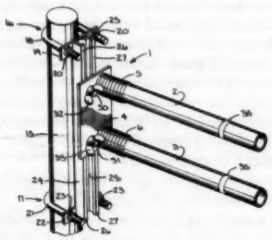
**4,516,771**
**BATTING AID**
**Alan J. Nau, 14640 Tulane St., Brookfield, Wis. 53005**
**Filed Dec. 23, 1982, Ser. No. 452,740**
**Int. Cl.³ A63B *69/40***
**U.S. Cl. 273—26 R** **7 Claims**



1. A batting practice device, comprising:
a mounting plate;
a pair of elongated arms resiliently mounted at their inner ends on said plate and projecting outwardly therefrom, said resilient mounting includes spring means between the inner end of each of said elongated arms and said mounting plate, said elongated arms being spaced apart and parallel to one another and disposed at an upward inclination from said mounting plate to form an unobstructed target area for passage of a bat therebetween during a practice swing; and
means for releasably securing said plate to a supporting structure.

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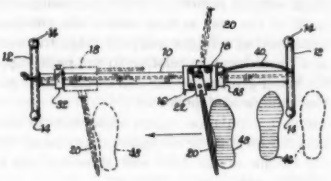
**4,516,772**
**BASEBALL BATTING TRAINER**
**William P. Stratton, 815 Coronado Ct., San Diego, Calif. 92109**
**Filed Feb. 14, 1983, Ser. No. 466,098**
**Int. Cl.³ A63B *69/40***
**U.S. Cl. 273—26 R** **10 Claims**

1. A baseball batter's trainer for training batters in proper foot position and movement during the batting swing comprising:
(a) means for positioning the batter's rear foot;
(b) a rail extending along the desired path of the batter's front foot during a swing; and
(c) a front foot guide slideably movable along said rail;



said front foot guide comprising a rider slideably movable on said guide rail; a paddle extended from said rider to engage the



forward portion of the foot; and means for biasing said paddle rearwardly.

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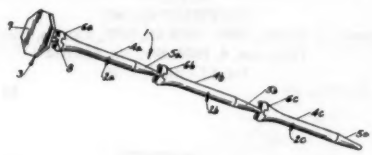
**4,516,773**
**GOLF TEES AND BALL MARKER ASSEMBLY**
**Clyde J. Martin, 8767 Appleknoll La., Cincinnati, Ohio 45236**
**Filed Oct. 18, 1982, Ser. No. 434,757**
**Int. Cl.³ A63B *57/00***
**U.S. Cl. 273—32 A** **3 Claims**



1. A one-piece package for golfers including at one end thereof a ball marker having a flat first end and a pointed second end, and connected to said pointed second end of said ball marker a plurality of solid golf tees, wherein each tee has a central portion, a first pointed end, and a second flat enlarged end containing at least 3 prongs by which a golf ball may be supported, said tees being separably connected in an end-to-end relationship so that said plurality of connected tees and ball marker may first be used as a swizzle stick, said tees being separable from one-another by a readily fracturable joint.

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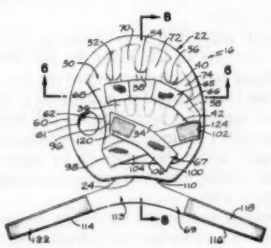
**4,516,774**
**HAND PADDLE FOR A PADDLE BALL GAME**
**David L. Nankivell, 5792 Carell Ave., Agoura Hills, Calif. 91301**
**Filed Jun. 1, 1983, Ser. No. 499,937**
**Int. Cl.³ A63B *59/00***
**U.S. Cl. 273—67 B** **26 Claims**



1. A paddleball game hand paddle for being worn on the fingered hand of a user comprising:
a back member having a lower edge for positioning adjacent

the wrist of a user and a hand conformed back surface comprising:

a contoured palm support region;

a plurality of elongated depressions extending from the palm support region, each for receiving a finger of the hand of the user at least one of the elongated depressions having a finger gripping ridge transverse thereto at a distal location relative to the palm support region for being gripped by the end of the finger positioned in that elongated depression;

a thumb manipulation region adjacent both the palm support region and the elongated depressions for receiving the thumb of the user and allowing side-to-side and upward manipulation thereof;

a ball contacting front member affixed to the back member at a location opposite the hand conformed back surface;

retention strap means attached to the back member for holding the hand paddle on the user's hand; and

a ball receiving depression in the thumb manipulation region.

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**4,516,775**

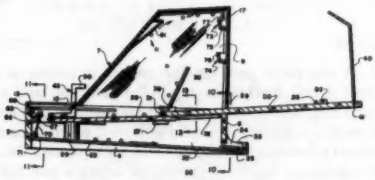
## BASEBALL GAME

**Benjamin D. Suarez, 2000 - 49th St., NW., Canton, Ohio 44709**

**Filed Jan. 4, 1984, Ser. No. 568,054**

**Int. Cl.³ A63F** *7/06*

**U.S. Cl. 273—89** **24 Claims**



1. A baseball game adapted to be played by two players, including:

(a) a base;

(b) a generally transparent enclosure mounted on the base;

(c) inclined surface means mounted on the base and extending upwardly outwardly beyond the enclosure for forming a ball delivery path and a pitching station at an outer end thereof;

(d) a pivotally mounted bat located adjacent an inner end of the inclined surface means adapted to be manually moved by one of the players for striking a ball propelled by the other player;

(e) a ball adapted to be propelled by the other player from the pitching station along the ball delivery path of the inclined surface means toward the bat;

(f) a hand manipulated wand adapted to be operated by said other player for propelling the ball toward the bat;

(g) a plurality of elevated ball receiving compartment means located within the enclosure for capturing a batted ball, with certain of the compartments designating a particular type of a hit;

(h) ramp means located within the enclosure for directing a ball struck by the bat upwardly toward the compartments; and

(i) a transparent shield extending upwardly from the extended end of the inclined surface means for protecting said other player from being struck by a batted ball.

**4,516,776**

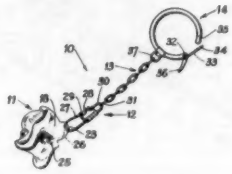
## GAME AND KEY CHAIN DEVICE

**Harry J. Nicholas, 44-4 Candlewood Lake Rd., New Milford, Conn. 06776**

**Filed Aug. 8, 1983, Ser. No. 521,038**

**Int. Cl.³ A63F** *9/04*

**U.S. Cl. 273—146** **9 Claims**



1. A game device, comprising:

a dice means having a nonsymmetrical configuration including a first (**15**), a second (**16**), a third (**17**) and a fourth (**18**) sides, and having a first end portion defined by a pair of spaced substantially rounded ear projections (**23**) and a second end portion defined by a pair of spaced leg projections (**24**), said first side being S-shaped with an S-shaped trough (**19**), said second side being opposite to said first side and having a whip-shaped curved ridge (**20**) extending from a knob like projection (**21**), said third side being substantially rectangular shaped with a central outwardly curved portion (**22**), said fourth side being opposite to said third side and having a substantially rectangular shape with a central recessed portion (**25**), said dice means configured for being tossed or rolled onto a playing surface such that one of five different resting positions each having an assigned game significance being possible by said dice means with each toss or roll thereof; and

a substantially flat rectangular playing surface board means having a plurality of mythography pictures each provided generally about a respective corner region of said board means and a central picture.

7. A method of entertaining or playing a game with one or more persons comprising the steps of:

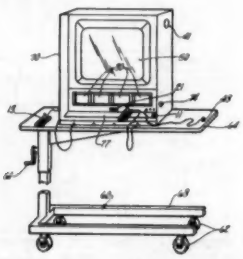
providing a single dice member having a shape substantially similar to an ankle bone portion of a sheep; assigning a meaning or associative significance to one or more of a possible five distinctive positions of the dice member with being tossed or rolled onto a substantially flat playing surface by a player;

providing a plurality of playing chips to each player; providing a jack pot having a plurality of playing chips; effecting game rules and activity including (a) each player taking a turn at rolling/tossing the dice member onto a playing surface, (b) if a predetermined first position whereby a designated king side of the dice member is rolled/tossed by a player that player is thence anointed the current king, (c) if a predetermined second position whereby a designated tax collector side of the dice member is rolled/tossed by a player that player collects a chip from the jack pot, (d) if a predetermined third position whereby a designated baker side of the dice member is rolled/tossed by a player that player gets an additional toss/roll of the dice member and if this player tosses/rolls three consecutive baker sides that player collects a chip from the jack pot, (e) if a predetermined fourth position whereby a designated punishment side of the dice member is rolled/tossed by a player that player must pay one chip to the king or if no king has yet been anointed this player must put one chip into the jack pot, (e) if a predetermined fifth position designated as Pegasus of the dice member is rolled/tossed by a player that player collects all the chips in the jack pot thereby ending the game, (f) the player having the most chips at the end of the game is declared the winner.

## 4,516,777
## MOBILE SELF-CONTAINED VIDEO GAME SYSTEM WITH INSTANTANEOUSLY SELECTABLE GAME CARTRIDGES

Robert J. Nikora, 6690 Windmill La., Union Lake, Mich. 48085

Filed Nov. 21, 1983, Ser. No. 553,540
Int. Cl.[3] A63F *9/22*; H05K *5/00*; A47F *81/06*
U.S. Cl. 273—148 B 5 Claims



1. A mobile, self-contained video game system comprising:
a plurality of video game cartridges each containing program instructions for playing a video game;
a video game console including means to receive a single video game cartridge and means for generating video and audio signals as determined by the program instructions contained on a video game cartridge;
a cartridge magazine connected to the means for receiving a single video game cartridge for receiving the plurality of video game cartridges and for providing electrical connections between a selected one of the plurality of video game cartridges and the video game console;
a video display device for displaying the video signals generated by the video game console;
a housing having an upper portion which encloses and retains the video game console, the cartridge magazine, and the video monitor in predetermined locations within the housing and a lower portion;
means for selecting one of the plurality of video game cartridges from without the housing;
video game controllers connected through the housing to the video game console for controlling the operation of the video game console; and,
a mobile base unit attached to the lower portion of the housing for providing means for transporting the video game system cross floor surfaces.

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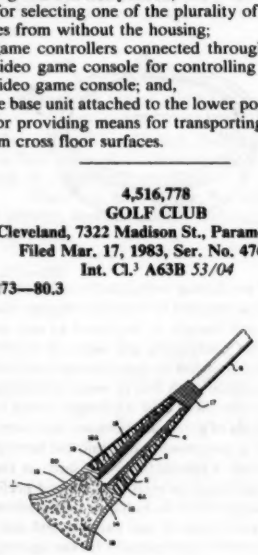
## 4,516,778
## GOLF CLUB

Roger C. Cleveland, 7322 Madison St., Paramount, Calif. 90723

Filed Mar. 17, 1983, Ser. No. 476,278
Int. Cl.[3] A63B *53/04*
U.S. Cl. 273—80.3 5 Claims



1. A golf club comprising a head and a shaft fitted thereto, said head including a stainless steel hollow body defining a hitting surface, a top wall, a sole member, a rear wall, a pair of side walls and a neck, characterized in that,
(a) said neck has a first shoulder at its lower end,
(b) said neck has a cylindrical portion extending upwardly from said first shoulder,
(c) said cylindrical portion has a relatively thin and substantially even thickness therearound,
(d) said cylindrical portion has fitted therein said shaft,
(e) a first radius is provided between said cylindrical portion and said first shoulder,
(f) a second radius is provided between said first shoulder and an inside wall of said head, and
(g) a plastic ferrule is mounted around said cylindrical portion such that said plastic ferrule stands on said first shoulder.

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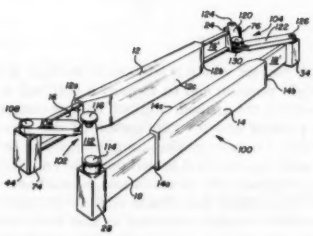
## 4,516,779
## GOLF TRAINING AID

Gardner H. Miller, Albuquerque, N. Mex., assignor to Trustroke International, Inc., Albuquerque, N. Mex.

Continuation-in-part of Ser. No. 409,418, Aug. 19, 1982, Pat. No. 4,423,875, which is a continuation-in-part of Ser. No. 398,112, Jul. 14, 1982, Pat. No. 4,413,826. This application Mar. 23, 1983, Ser. No. 478,165
The portion of the term of this patent subsequent to Nov. 8, 2000, has been disclaimed.
Int. Cl.[3] A63B *69/36*
U.S. Cl. 273—186 C 6 Claims



1. A golf training aid comprising:
first and second elongated telescopically extendable rail means each having first and second ends and being extendable to an operational position or retracted to a storage position;
first arm member having first and second ends, said first end being pivotally connected to said first end of said first elongated telescopically extendable rail means;
second arm member having first and second ends, said first end being pivotally connected to said first end of said second elongated telescopically extendable rail means;
said second ends of said first and second arm members being pivotally connected to thereby couple said first ends of said first and second elongated telescopically extendable rail means;
third arm member having first and second ends, said first end being pivotally connected to said second end of said first elongated telescopically extendable rail means;
fourth arm member having first and second ends, said first end being pivotally connected to said second end of said second elongated telescopically extendable rail means;
said second ends of said third and fourth arm members being pivotally connected to thereby couple said second ends of said first and second elongated telescopically extendable rail means;
said arm members being disposed between said first and second elongated telescopically extendable rail means, such that the spacing between said first and second elon-

gated telescopically extendable rail means is selected by pivoting said first and second arm members with respect to each other and said third and fourth arm members with respect to each other to thereby maintain said first and second elongated telescopically extendable rail means in a preselected spaced apart relationship throughout the entire length of said first and second elongated telescopically extendable rail means in said operational position; and

said arm members being disposed parallel to said first and second elongated telescopically extendable rail means in said storage position to enable the golf training aid to collapse to a compact configuration.

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**4,516,780**

## ADJUSTABLE GOLF BALL TEE

**Michael J. Tabet, Tabet Manufacturing Co., 1336 Ballentine Blvd., Norfolk, Va. 23516**

**Filed Dec. 11, 1979, Ser. No. 102,551**
**Int. Cl.³ A63B *57/00***
**U.S. Cl. 273—202** **4 Claims**

1. A golf ball tee which is adapted to be fixed in the ground in an upright position and to support a golf ball at a selected elevation above the ground, said golf ball tee comprising a peg having a pointed end for penetration of the ground and an opposite end, a bore extending longitudinally in the peg commencing with an open end in said opposite end of the peg and extending longitudinally towards said pointed end of the peg, said bore terminating in a closed end, an elongated ball supporting member slidably disposed in said bore, having a ball seat on one end exposed above said open end of the bore, and having a longitudinal slit therein, and a means for restraining said ball supporting member against complete removal from the bore comprising a pin disposed laterally across said bore and through said slit and means disposed across the slit and at an angle with respect to the longitudinal axis of the pin closing said slit against movement over said pin, said pin being disposed inwardly in the bore from the pin whereby the slit closing means strikes the pin when the support member slides in the direction from the said pointed end and the elongated support member is prevented from being completely removed from the said bore.

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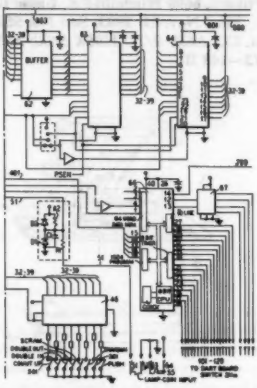
**4,516,781**

## DART GAME WITH TWO MICROCOMPUTERS

**Donald P. DeVale, Sycamore; Robert J. Brejcha, St. Charles, and Robert W. Van Naarden, Hinkley, all of Ill., assignors to Industrial Design Electronic Associates, Inc., Sycamore, Ill.**

**Filed Nov. 17, 1982, Ser. No. 442,356**
**Int. Cl.³ F41J *3/00, 3/02***
**U.S. Cl. 273—373** **7 Claims**

1. A dart game comprising a segmented dart target, a switch matrix associated with said segmented dart target, a first microcomputer connected to said switch marix and continuously scanning said matrix, a second microcomputer connected to said first microcomputer, a scoring indicator connected to said second microcomputer, means within said second microcomputer for controlling said first and second microcomputers so that they can operate together, including a game selector switch connected to said second microcomputer, including a plurality of indicator lights connected to said second microcomputer, and wherein said segmented dart target is formed with segments with holes for receiving darts and feet



attached to said segments and moveable to close selected ones of said matrix switches when a dart strikes a segment, wherein said continuous scanning of said matrix by said first microprocessor prevents any double scoring.

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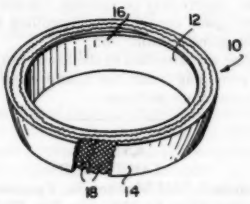
**4,516,782**

## METHOD OF PRODUCING HIGH TEMPERATURE COMPOSITE SEAL

**Peter P. Usher, Union, N.J., assignor to Metex Corporation, Edison, N.J.**

**Division of Ser. No. 856,174, Nov. 30, 1977,. This application Aug. 29, 1983, Ser. No. 527,247**
**Int. Cl.³ F16J *15/12;* B32B *31/06***
**U.S. Cl. 277—1** **3 Claims**

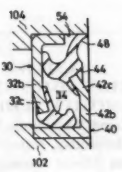



1. A method of producing substantially coherent high temperature exhaust seal adapted to sealingly engage confronting surfaces on pipes and flanges to be joined to one another to form a flexible joint comprising the steps of constructing a generally cylindrical preform by convoluting a strip of flexible refractory sheet material with one or more overlaying pieces of flexbile knitted wire mesh said wire mesh being formed of wire and having voids of given size between said wires, disposing said preform in a compression die, said die having a cavity size and shape which is substantially the same as the desired exhaust seal, and applying an axial load to said preform, said load being of sufficient force to collapse said preform to substantially the size and shape of said exhaust seal and to cause said refractory material to substantially fill the openings in said wire mesh and substantially all other air voids within said exhaust seal and to become firmly interlocked with said wire mesh.

## 4,516,783
## SEAL ASSEMBLY WITH RADIALLY OVERLAPPING SEAL MEANS

Naoki Mitsue, and Hideki Takahashi, both of Fujisawa, Japan, assignors to Nippon Seiko K.K., Tokyo, Japan

Continuation of Ser. No. 575,763, Feb. 1, 1984, abandoned. This application Jun. 8, 1984, Ser. No. 618,555
Claims priority, application Japan, Feb. 12, 1983, 58-21842
Int. Cl.³ F16J *15/32, 15/38;* F16C *33/72*
U.S. Cl. 277—50 5 Claims




1. A seal assembly for sealing a chamber formed between radially inner and outer members disposed coaxially and spaced apart radially from each other, the members being rotatably relative to each other,

the seal assembly comprising:

a first radial member extended radially inwardly from the outer member toward the outer periphery of the inner member,

a second radial member disposed axially outside from the first radial member and extended radially outwardly from the inner member toward the outer member so that the first and second radial members may oppose to each other,

a first seal means disposed between the tip end of the first radial member and the inner member,

a second seal means disposed between a side surface of the first radial member and the second radial member,

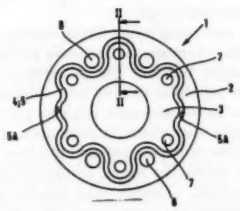
a third seal means disposed between the outer member and the second radial member, and

the first, second and third seal means being so formed that leak of lubricant contained in the chamber may be permitted, while flow of foreign material from exterior may be prevented.

## 4,516,784
## SEAL ASSEMBLY WITH RADIALLY UNDULATED SEALING ELEMENT

Johann Merz, Schwäbisch Gmünd, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany

Filed Aug. 9, 1984, Ser. No. 639,209
Claims priority, application PCT Int'l Appl., Aug. 27, 1983, PCT/EP83/00226
Int. Cl.³ F16J *15/12*
U.S. Cl. 277—180 9 Claims




1. A seal assembly for sealing registering flow passages (21, 22) of assembled components (18, 23) and wherein said seal assembly comprises a pair of carrier rings with radial spacing therebetween for carrying a sealing element of compressible material in said spacing, wherein said sealing element extends axially beyond the thickness of said carrier rings;

one said ring (3) having flow passage apertures (7) for registering, respectively, with said flow passages of said assembled components and the other said ring (2) having assembly screw bores (8) therethrough for accommodating assembly screws securing said assembled components together;

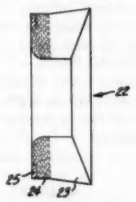
the improvement wherein:

said sealing element comprises a sealing ring radially undulated to continuously wind around said flow passage apertures and said assembly screw bores and being convex radially outward of said flow passage apertures to effect sealing thereof within said sealing ring upon being compressed when said components are assembled, and being concave radially around said assembly screw bores.

## 4,516,785
## PISTON WITH A CONTROLLED EXPANSION PISTON ANTI-EXTRUSION RING

John E. Miller, Dallas, and Dennis J. Fortino, Plano, both of Tex., assignors to Chromium Corporation, Richardson, Tex.

Filed Dec. 10, 1982, Ser. No. 448,430
Int. Cl.³ F16J *15/18*
U.S. Cl. 277—188 A 7 Claims




1. In a pump sealing device for a reciprocating pump used to pump abrasive liquids, said pump having a cylinder, a piston with a flange, and a gap between the cylinder and flange, said sealing device comprising an elastomeric seal for sealing said fluid having a first face in contact with the fluid being pumped, a second face in sealing contact with the cylinder, and a heel section resting at least in part in contact against the flange; and an anti-extrusion ring;

the improvement wherein said anti-extrusion ring is expandable and bonded to the heel section of said elastomeric seal so that the expansion of said ring is controlled by the expansion of the heel section of said elastomeric seal, said ring being sized to be in intimate, movable contact with said cylinder, being located adjacent to the flange and to the heel section of the seal, having at least one split through it to allow for radial expansion of the ring, and being of a material having a modulus of elasticity of at least 10,000,000 psi and a yield strength, size and shape sufficient to prevent the ring from permanently deforming under hydrostatic pressures generated in the cylinder during pumping operations.

## 4,516,786
## CORE CHUCK

Arnold M. Lund, 1210 Avocado Ave., Escondido, Calif. 92026

Filed Mar. 8, 1983, Ser. No. 473,240
Int. Cl.³ B23B *31/40*
U.S. Cl. 279—2 R 8 Claims

1. A chuck for a tubular core, comprising:

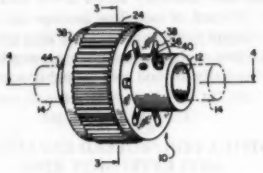
a cylindrical sleeve;

a plurality of spaced apart cams surrounding the intermedi-

ate portion of the sleeve and having a plurality of flat aligned faces;

a like plurality of circumferentially spaced segments freely positioned in overlying relationship with the cams, each segment having a flat inner surface overlying a corresponding set of aligned faces of the cams, outwardly diverging side surfaces, an arcuate outer surface, a pair of opposing end surfaces, and guide pins extending perpendicular from the end surfaces;

a pair of disks mounted on opposite ends of the sleeve with the segments positioned therebetween, each disk having a plurality of circumferentially spaced, radially extending



slots for receiving the guide pins of the segments to limit radial movement of the segments;

a plurality of spring rings surrounding the sleeve and positioned between adjacent ones of the cams for yieldingly urging the segments radially outwardly into uniformly spaced relationship relative to the sleeve; and

means for locking the position of the sleeve relative to a shaft inserted through the sleeve;

the slots and springs being dimensioned so that when the cams rotate relative to the segments, the cams engage the inner surfaces of the segments and move the segments radially outwardly.

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**4,516,787**

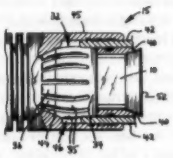
**LIGHTGUIDE PREFORM CHUCK**

**Edward R. Venable, Gwinnett County, Ga., assignor to AT&T Technologies, Inc., Berkeley Heights, N.J.**

**Filed Nov. 10, 1982, Ser. No. 440,774**

**Int. Cl.³ B23B *31/16***

**U.S. Cl. 279—1 SG** **9 Claims**



1. Apparatus for holding an object under elevated temperature conditions comprising a collet made of a material and so constructed to permit lateral deflection of intermediate portions and end portions thereof and being of a size and structure such as to have portions thereof adapted to be placed adjacent to the object and in clamping engagement therewith, said collet also being formed of a material having a selected coefficient of thermal expansion, and collet restraining means being formed of a material having a coefficient of thermal expansion less than said selected coefficient of thermal expansion, said collet restraining means being in engagement with each end portion of said collet to restrain normal longitudinal movement of said collet during relative thermal expansion of said collet with respect to said collet restraining means while permitting and causing lateral deflection of end and intermediate portions thereof to maintain clamping engagement of the end portions with the object, said collet restraining means being spaced from an intermediate portion of said collet to permit lateral deflection of the intermediate portions of said collet so that during conditions of elevated temperatures stresses set up in the material of the collet caused by the restraint of the normal longitudinal thermal expansion of the collet are translated into lateral deflection of the end portions of the collet to maintain the end portions of the collet in clamping engagement with the object and lateral deflection of intermediate portions of the collet to maintain kinetic clamping force on the object caused by the resiliency of the laterally deflected intermediate portions of the collet.

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**4,516,788**

**SEATING POSITION ADJUSTING DEVICE FOR AN AUTOMOTIVE VEHICLE SEAT**

**Yoshihiro Umetsu, Zama; Masakazu Muraishi, Isehara; Osamu Ito, Ebina, and Masakatsu Kakeba, Tanashi, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

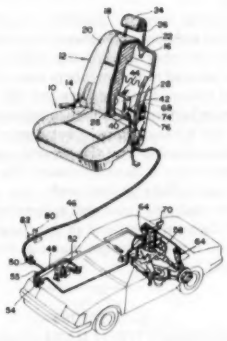
**PCT No. PCT/JP82/00477, § 371 Date Aug. 12, 1983, § 102(e) Date Aug. 12, 1983, PCT Pub. No. WO83/02219, PCT Pub. Date Jul. 7, 1983**

**PCT Filed Dec. 24, 1982, Ser. No. 532,030**

**Claims priority, application Japan, Dec. 29, 1981, 56-211640**

**Int. Cl.³ A47C *7/46*; B60N *1/06*; B60G *17/00***

**U.S. Cl. 280—6 R** **10 Claims**



1. An adjusting device for an automotive vehicle seat comprising:

means defining a pneumatic chamber in a seat for an automotive vehicle;

a vehicle height adjusting means which detects the relative displacement between the vehicle body and the axle of a wheel of the vehicle and regulates the pressure of the working gas supplied by a pressure supply source included therein so as to maintain the displacement within a predetermined range;

a pressure increasing means for increasing the pressure in the pneumatic chamber, said pressure increasing means being so arranged between the pneumatic chamber and the pressure supply source of said vehicle height adjusting means as to introduce the working gas fed from the pressure supply source into the pneumatic chamber to increase the volume of the pneumatic chamber;

a pressure decreasing means for decreasing the pressure in the pneumatic chamber, said pressure decreasing means being adapted to vent the pneumatic chamber to the ambient air so as to exhaust the working gas from pneumatic chamber to the ambient air to decrease the volume of the pneumatic chamber; and

operation means for adjusting the seating position of the seat

by selectively actuating said pressure increasing means or pressure decreasing means.

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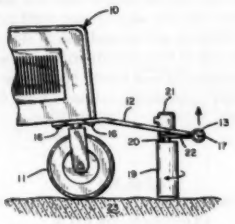
**4,516,789**

## CROP CLEARING MECHANISM

**Donald E. Dufner, Rte. 1, Box 124, Buxton, N. Dak. 58218**

**Filed Sep. 27, 1982, Ser. No. 423,668**
**Int. Cl.³ B60R *19/00***
**U.S. Cl. 280—160** **4 Claims**



1. Apparatus for clearing or displacing a crop to either side of the wheel of a tractor comprising, in combination:

a pair of support bars secured to said tractor, one on either side of said wheel, in cantilevered attachment with forwardly projecting ends having limited vertical deflection;

a draw bar mounted to and extending between said forwardly projecting ends;

a pair of rearwardly projecting motor mounts pivotally attached to said draw bar, including a stop member for limiting pivotal motion of said motor mounts to a predetermined angular range; and

a rotatable cylinder and means for rotatably driving said cylinder attached to each of said rearwardly projecting motor mounts, with said cylinder projecting downwardly and forward of said tractor wheel;

whereby said cylinders may be rotatably driven in opposite directions and said cylinders may each be deflected upwardly upon contacting obstacles while clearing or displacing a crop.

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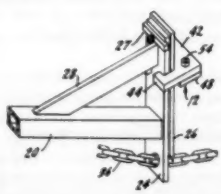
**4,516,790**

## SLIDE ADJUSTMENT MEMBER FOR A VEHICLE TOWBAR

**Lawrence E. Hampel, St. Charles, and Edward O. Freese, North Aurora, both of Ill., assignors to Moline Corporation, St. Charles, Ill.**

**Filed Oct. 28, 1982, Ser. No. 437,350**
**Int. Cl.³ B60D *1/14***
**U.S. Cl. 280—502** **4 Claims**



1. In a towbar assembly of the type having a coupler head, a pair of channel arms each-pivotally connected at one end to the coupler head, a vertically-disposed face plate connected to each of the other ends of the channel arms, and tow chains secured to the channel arms, the improvement comprising a slide adjustment member associated with each face plate, each slide adjustment member having a body-portion and a slot defined by a pair of fingers, the face plate being disposed within the slot with the fingers encompassing the face plate such that when the slide adjustment member is substantially perpendicular to the face plate the adjustment member will readily slide up and down on the face plate whereas when the slide adjustment member is disposed at an angle to the face plate the adjustment member will bind on the face plate and remain fixed.

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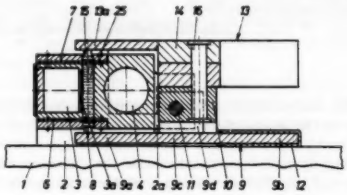
**4,516,791**

## SAFETY SKI BINDING

**Wilfried Riss; Theodor Nitschko, both of Vienna; Engelbert Spitaler, Wr. Neudorf, and Gerhard Oberleitner, Vienna, all of Austria, assignors to TMC Corporation, Baar, Switzerland**

**Filed Mar. 28, 1983, Ser. No. 479,407**
**Claims priority, application Austria, Mar. 30, 1982, 1230/82**
**Int. Cl.³ A63C *9/08***
**U.S. Cl. 280—612** **5 Claims**



1. In a safety ski binding which includes two jaws which hold a ski boot, of which one can be released in an electric manner and the other one is constructed as a holding jaw which has a sensing element for detecting forces which act onto the ski boot upwardly, downwardly, and transversely, wherein signals which are produced by the sensing element can be processed in a control circuit which, if predetermined limit values are exceeded, emits a release signal, the improvement comprising wherein the holding jaw has two sole holders which hold the ski boot sole from above and from the side, are hinged slightly swingably on a pin which extends perpendicular to the upper side of the ski and are also slightly swingable about a further pin which extends transversely to the longitudinal direction of the ski and parallel to the upper side of the ski, wherein the sole holders are each provided with a pressure piston which acts on at least one of a differential pressure cell and a respective absolute pressure cell, wherein at least one of the sole holders has in a region which does not face the ski boot a pressure pin which can act on a further absolute pressure cell, and wherein a stepping plate is slightly pivotally supported a small distance from the upper side of the ski on the further pin which extends transversely to the longitudinal direction of the ski and parallel to the upper side of the ski, which stepping plate carries at its end which does not face the ski boot a pressure pin which can also act on the further absolute pressure cell, each of the pressure cells being part of the sensing element.

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**4,516,792**

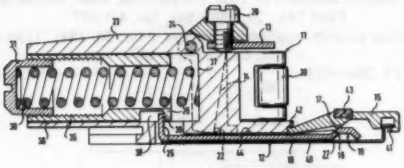
## LATERALLY RELEASABLE TOE UNIT FOR A SKI SAFETY BINDING

**Georg Scheck, Leonberg, and Martin Bogner, Ostfildern, both of Fed. Rep. of Germany, assignors to GEZE GmbH, Fed. Rep. of Germany**

**Filed Jun. 21, 1983, Ser. No. 506,219**
**Claims priority, application Fed. Rep. of Germany, Aug. 13, 1982, 3230187**
**Int. Cl.³ A63C *9/085***
**U.S. Cl. 280—625** **3 Claims**

1. A laterally releasable toe unit for a ski safety binding for securing a ski boot to a ski, said toe unit comprising first and

second laterally pivotable side jaws; a yoke for holding said first and second laterally pivotable side jaws in a ski boot retaining position; a release spring disposed to bias said yoke in a direction to hold said side jaws in said ski boot retaining position, said side jaws being pivotable laterally against the spring bias to release the ski boot; a toe plate disposed to receive a toe portion of a ski boot thereon, said toe plate being movable in a direction perpendicular to said ski; a force deflecting transmission means operative between said toe plate and said spring for exerting a force on said spring against the spring bias, said force being dependent on a contact force acting on said toe plate perpendicular to said ski, said force



deflecting transmission means comprising a bar member extending in the longitudinal direction of the ski and bearing against said yoke; a laterally fixedly located toe restrainer for restraining upward movement of said toe portion away from said ski, said toe restrainer being movable in an upward direction away from said ski; and at least one lever operatively associated with said toe restrainer and responsive to an upwardly directed force acting on said toe restrainer to act on said bar member to move same in a direction to exert a relief force against said spring bias in the same sense as said force deflecting transmission means exerts, said relief force being related to said upwardly directed force.

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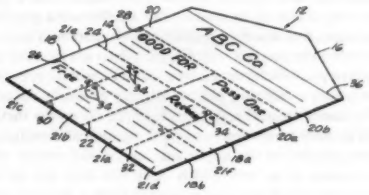
**4,516,793**

## ADVERTISING ARTICLE AND METHOD OF MAKING SAME

**Jerrilyn C. Kiyokane, Long Beach, Calif., assignor to Namkung Promotions Inc., Costa Mesa, Calif.**

**Filed Mar. 10, 1983, Ser. No. 473,953**
**Int. Cl.[3] B42D *15/00*; B41L *1/20***
**U.S. Cl. 283—103** **3 Claims**




1. A method of making a device for use in advertising comprising the steps of:

(a) printing indicia on a first side of a planar sheet having first and second sides;

(b) cutting said planar sheet to form a shaped sheet having an upper tab portion, a lower portion and an intermediate portion;

(c) perforating said shaped sheet along a first line dividing said lower and intermediate portions, along a second line bisecting said lower portion to form first and second portions and along a third line bisecting said intermediate portion to form third and fourth portions, said fourth portion having advertising indicia imprinted thereon;

(d) perforating said shaped sheet along a fourth line extending substantially perpendicular to said first, second and third lines, said fourth line substantially bisecting said first, second and third portions to form an advertising display portion and at least six removable, redeemable coupon portions;

(e) folding said shaped sheet along said first line to form a folded sheet wherein the second sides of said lower and intermediate portions are in engagement;

(f) folding said folded sheet along said second line to bring the first sides of said first and second portions into engagement;

(g) folding said tab portion of the device thus formed along a line dividing said tab portion and said intermediate portion to bring the second side of said tab portion into engagement with the first side of said third portion; and

(h) removably affixing said second side of said tab portion to said third portion to form an advertising device displaying advertising indicia on said fourth portion but substantially concealing said redeemable coupons from view.

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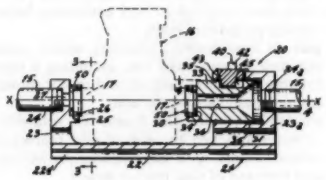
**4,516,794**

## METER PIT MOUNTED HOLDER FOR A WATER FLOW CONTROL DEVICE

**Larry D. Zorb, and L. Harvey Wicklund, both of Bigfork, Mont., assignors to Zorwick Corp., Bigfork, Mont.**

**Filed Nov. 5, 1982, Ser. No. 439,353**
**Int. Cl.[3] F16L *55/00***
**U.S. Cl. 285—30** **10 Claims**



1. A pit holder for releasably mounting a flow control device such as a water meter having opposed coaxial pipe connectors to a waterline at the bottom of an excavated meter pit, the holder comprising;

a cradle frame including an elongated cradle base adapted to rest against the bottom of a meter pit;

rigid upstanding legs at opposite ends of the base, having coaxial bores adapted for connection to a water line and for holding the water line stationary to the frame;

first and second saddle members on the cradle frame legs having coaxial bores formed on a prescribed axis, with each saddle having a pipe connector receiving saddle facing upwardly and adapted to vertically receive and release the pipe connectors;

the first saddle member being stationary on one of the cradle legs;

the second saddle member being mounted to the remaining leg of the cradle frame for horizontal sliding translational movement along the prescribed axis independently of the water line between an operative position adapted to axially clamp a flow control device by the saddle members between its pipe connectors, and an inoperative position in which the device can be moved vertically to engage or disengage the pipe connectors thereof with the saddle members;

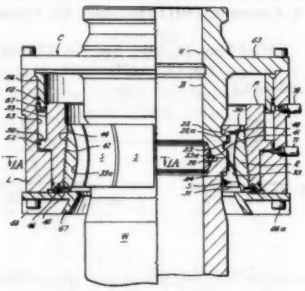
linkage means between the second saddle member and cradle frame adapted for operation from above the excavated meter pit for moving the second saddle member between its operative and inoperative positions; and

wherein the linkage means includes a cam locking means selectively operable to lock the second saddle member in its operative position.

## 4,516,795
## TORUS TYPE CONNECTOR

**Benton F. Baugh, 14626 Oak Bend, Houston, Tex. 77079**

**Filed Jan. 28, 1982, Ser. No. 343,496**
**Int. Cl.³ F16L *37/18***
**U.S. Cl. 285—315** **12 Claims**



1. A connector for connecting tubular members to a wellhead, comprising:

a. a connector body having a passage extending therethrough and including a lower end with a locking surface formed thereon for receiving locking means;

b. a plurality of circumferentially spaced locking segments adjacent the lower end said connector body, said locking segments having upper ends and lower ends with a generally concave torodial outer surface between such ends and upper and lower inner locking surfaces for engaging said locking surface on said connector body and a locking surface on said well head;

c. torus drive means surrounding the locking segments having a generally torodial curved inner surface for engaging the concave torodial curved surfaces on said locking segments for moving the lower ends of said locking segments inwardly into locking engagement with the well head as said torus drive means is moved axially of said connector body in a first direction and moving the lower ends of said locking segments outwardly as said drive means is moved axially of said connector body in the opposite direction; and

d. means for moving said torus drive means axially in said first and opposite directions with respect to said connector body.

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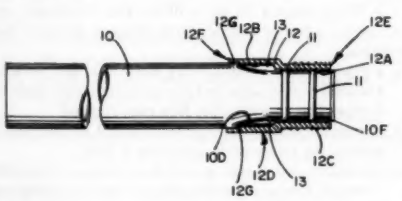
## 4,516,796
## FLUID COUPLING

**Steven L. Hudson, Howell, Mich., assignor to The Estate of Thomas S. Krause, Howell, Mich.**

**Filed Mar. 28, 1983, Ser. No. 479,684**
**Int. Cl.³ F16L *39/00***
**U.S. Cl. 285—321** **10 Claims**




1. A fluid coupling which comprises:

(a) conduit means (**10**, **20**) with an enlarged section (**10A**, **20A**) having a first outside cross-sectional width and having at one end (**10C**, **20C**) a reduced section (**10B**, **20B**) with a cylindrical exterior surface which has an outside diameter smaller than the width of the conduit means and with a truncated conical shoulder (**10D**, **20D**) between the sections;

(b) connector means (**12**, **22**) mounted on the cylindrical surface adjacent the one end with (**1**) a first cylindrical interior opening (**12A**, **22A**) adjacent a first end (**12E**, **22E**) of the connector means having a first inside diameter to provide a precision rotational fit with a portion of the reduced section of the conduit means and (**2**) an enlarged second opening (**12B**, **22B**) adjacent a second end (**12F**, **22F**) of the connector means opposite the first end, the second opening being larger than the outside diameter of the exterior surface of the reduced section and smaller than the width of enlarged section of the conduit means, the connector means having an exterior threaded surface (**12C**, **22C**) adapted to fit a mating threaded opening and having an exterior wrench engaging surface (**12D**, **22D**) for threading the connector means into the threaded opening such that there is a sealed fluid connection with the conduit means;

(c) retaining means (**10F**, **23**) for rotatably holding the conduit means and connector means together such that the shoulder abuts the connector means adjacent to second end; and

(d) seal means (**11**, **21**) between and in sealing engagement with the exterior surface of the conduit means and the interior surface of the connector means.

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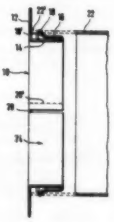
## 4,516,797
## FLANGED RING FOR TUBES

**Manfred Meinig, Weilheim, Fed. Rep. of Germany, assignor to Karl Meinig, KG, Weilheim, Fed. Rep. of Germany**

**Filed Sep. 29, 1982, Ser. No. 427,151**
**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1981, 3143893**
**Int. Cl.³ F16L *23/00*, *17/00***
**U.S. Cl. 285—405** **19 Claims**



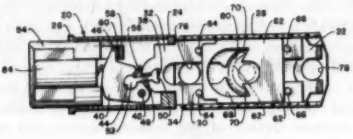
1. A one-piece flanged ring which can be mounted on a thin-walled, round sheet-metal tube, for making a butt joint between two tube sections, having an approximately radially outwardly protruding securing flange and an arm projecting from the inner end of the securing flange, characterized by a ring land (**18**) bent obliquely outward toward the securing flange (**12**) by the arm (**14**), the arm (**14**) and the ring land (**18**) being drivable with pre-stressing into the interior of the tube, wherein the largest diameter of the arm (**14**) is smaller, and the largest diameter of the ring land (**18**) in the unstressed state is larger, than the inside diameter of the tube (**22**), wherein the arm (**14**) projects approximately perpendicularly from the securing flange (**12**), and wherein the arm (**14**) has a centering arm (**16**) bent back approximately parallel to itself and supporting the ring land (**18**).

**4,516,798**

## LATCH BOLT OPERATING ASSEMBLY HAVING BOLT OPERATING IMPROVEMENTS

**Gary R. Bergen, Yorba Linda, Calif., assignor to Emhart Industries, Inc., Farmington, Conn.**

**Filed Apr. 11, 1983, Ser. No. 483,550**
**Int. Cl.³ E05C *1/16***
**U.S. Cl. 292—169.13** **22 Claims**



**1**. In a latch construction of the type having a frame mounting a bolt movable from a forward extended position to a rearward retracted position by motion of a rearward operator acting through latch operating mechanism; the latch operating mechanism including: a retractor forwardly and rearwardly movable in said frame and having a rearward portion operably connected to the rearward operator for transferring rearward operator motions into rearward retractor movements, a cam with a base end thereof pivotally connected to said frame and a free portion thereof pivotal forwardly and rearwardly of said frame, said cam free portion being operably connected to said bolt conveying rearward motion to said bolt upon rearward pivoting of said cam; a link pivotally connected at a rearward end thereof to a forward portion of said retractor and at a forward end thereof to said cam free portion spaced from said base end; a bolt extension secured extending rearwardly from said bolt and said cam free portion positioned extending into said bolt extension.

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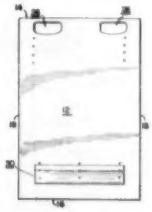
**4,516,799**

## SNOW REMOVAL DEVICE

**Brian C. O'Donnell, 172 Courtenay La., Schaumburg, Ill. 60193**

**Filed Mar. 15, 1984, Ser. No. 589,947**
**Int. Cl.³ E01H *5/02***
**U.S. Cl. 294—54.5** **8 Claims**



**1**. A snow removal device operable by a user while maintaining the user's back in a generally upright position for reducing strain on the back muscles during snow removal, comprising a generally flat polygonal member having a scraping edge at a lower end thereof, gripping means adjacent an upper end of said member, said member adapted to be normally maintained at an angular position with the scraping edge in sliding engagement with a surface from which snow is being removed and a polygonal kick plate releasably secured to said member between said scraping edge and said upper end and being positioned substantially closer to said scraping edge than said upper edge so that a user's foot can engage said kick plate and produce a substantial force forwardly and outwardly on said member as said member is pulled backwardly and upwardly by said gripping means for removing the snow accumulated by said scraping edge and said device, said polygonal member having a plurality of sets of holes with fasteners extending through said holes and said polygonal kick plate so that said kick plate can be secured to said member in a plurality of adjusted positions using different sets of holes.

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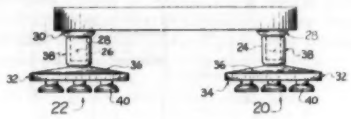
**4,516,800**

## DEVICE FOR PICKING UP AND HANDLING DRAFTING TEMPLATES, TRIANGLES AND THE LIKE

**Rodolfo A. Coronado, 35012 Hollyhock St., Union City, Calif. 94587**

**Filed Mar. 11, 1983, Ser. No. 474,568**
**Int. Cl.³ A47B *97/06***
**U.S. Cl. 294—64.1** **10 Claims**



**1**. A device for handling flat-sided drafting templates having various shaped through holes extending between opposite flat sides of the latter in spaced apart relationship to one another, said device comprising a handle adapted to be held by the fingers of a draftsman and a plurality of suction cups fixedly connected with said handle and positioned relative to the latter so as to easily attach to a flat side of any of said templates by means of suction while said handle is being held by said draftsman, whereby the device can be used to pick up and manipulate said tools, said plurality of suction cups including a group thereof, positioned adjacent to one another, each of which is at least as small in cross section as most, if not all, of spaces between said through holes in said templates, whereby at least one of said suction cups can be attached in its entirety to a given one of said templates.

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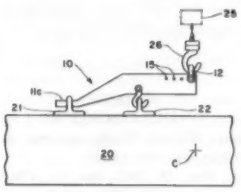
**4,516,801**

## POD LIFTING ADAPTOR

**David E. Burd, 5968 Albrecht Ave., Marysville, Calif. 95901**

**Filed Dec. 16, 1983, Ser. No. 562,264**
**Int. Cl.³ B66C *1/66***
**U.S. Cl. 294—81.5** **1 Claim**



**1**. A lifting adaptor for use in lifting and moving an elongate load having a pair of spaced lifting brackets attached thereto, comprising:

a. a beam having a substantially horizontal first portion and a second portion attached at a predetermined angle to said first portion at respective first ends thereof;

b. connector means near the second end of said first beam portion for removeably attaching a hoist;

c. the second end of said second beam portion terminating in a narrow tongue of predetermined size for insertion into a first of said lifting brackets, said tongue disposed substantially parallel to said first beam portion at;

d. a lifting hook attached to said first beam portion intermediate said connector means and said tongue for engaging the second of said lifting brackets, said hook disposed in

substantial alignment with said tongue whereby said tongue and said lifting hook engage both said lifting brackets simultaneously; and

e. said first beam portion sized to define a lifting point at said connector means near said second end of said first beam portion, said point lying on a vertical line passing near the center of gravity of said load.

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**4,516,802**

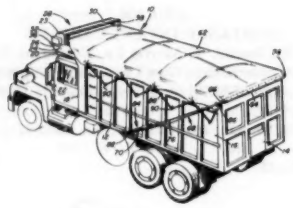
## TRUCK COVER

**Warren L. Compton, Rte. 5, Box 87, Fairmont, W. Va. 26554**

**Filed Dec. 2, 1982, Ser. No. 446,260**

**Int. Cl.³ B60P** *7/04*

**U.S. Cl. 296—98** **10 Claims**



1. A cover roll assembly for a vehicle having a headboard positioned forwardly of an open body comprising,

a take-up roll mounted transversely on the headboard,

support means connected to the take-up roll for rotatably supporting the take-up roll,

a flexible cover rolled up on said take-up roll and extending substantially across the width of the vehicle headboard,

a bail assembly including a pair of parallel legs spaced apart substantially the width of the open body and having end portions pivotally connected on opposite sides of the open body,

a cross bar connecting said pair of parallel legs movable between an open position closely adjacent said take-up roll at one end of the open body and a closed position displaced from said take-up roll at an opposite end of the open body,

said flexible cover having one end secured to said take-up roll and an opposite end secured to said cross bar,

biasing means for exerting a force upon the bail assembly to move said cross bar from said open position with said flexible cover rolled up on said take-up roll to said closed position with said flexible cover unrolled and extending over and covering the open body,

power means drivingly connected to said take-up roll for rotating said take-up roll in a first direction to initiate unrolling of said flexible cover and operation of said biasing means to actuate pivotal movement of said bail assembly to move said cross bar from said open position to said closed position and unroll said flexible cover to cover the open body,

said power means being operable to rotate in a second direction and actuate pivotal movement of said bail assembly and return said cross bar to said open position and roll up said flexible cover on said take-up roll,

guide means mounted adjacent the end portions of said cross bar and engageable with said flexible cover for maintaining said flexible cover centered on said take-up roll as said flexible cover is unrolled and rolled on said take-up roll,

said flexible cover including lateral edge portions,

said guide means including a pair of guide rollers rotatably positioned in contact with said lateral edge portions, and

said guide rollers being vertically positioned and spaced a preselected distance apart to maintain contact with said lateral edge portions so that as said cover is rolled up on said take-up roll said guide rollers guide said cover to a centered position on said take-up roll.

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**4,516,803**

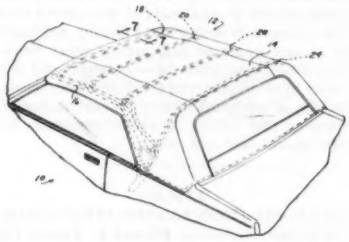
## VEHICLE WITH A CONVERTIBLE TOP

**Milton C. Kaltz, Allen Park; Michael P. Alexander, Grosse Ile, and Richard Cichoski, Sterling Heights, all of Mich., assignors to ASC Incorporated, Southgate, Mich.**

**Filed Apr. 29, 1983, Ser. No. 489,817**

**Int. Cl.³ B60J** *7/00*

**U.S. Cl. 296—107** **6 Claims**



1. In a vehicle having a folding top comprised of a plurality of articulatable interconnected members movable between raised and lowered positions and mounted within a passenger compartment defined by a floor pan, front windshield, spaced rocker panels, rear quarter panels, wheelhouse panels, an upper back panel extending between the rear quarter panels and a trunk compartment formed between the rear quarter panels, the upper back panel and a trunk floor pan, the improvement comprising:

vehicle support structure including:

quarter panel reinforcement means mounted to and extending between the rear quarter panels and the floor pan;

brace means extending between and mounted to the wheelhouse panels and the quarter panel reinforcement means;

belt line reinforcement means secured to the upper back panel and spaced above the floor pan of the vehicle; and

means for attaching the belt line reinforcement means to the quarter panel reinforcement means such that an aperture is formed between the wheelhouse panels, the floor pan, and the belt line reinforcement means disposing the passenger and trunk compartments of the vehicle in communication.

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**4,516,804**

## VEHICLE BODY CEILING SEAL CONSTRUCTION

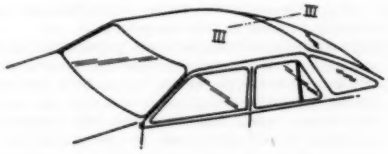
**Takeshi Yamawaki, Okazaki; Tatuya Saitou, and Sigemi Sugimori, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Jul. 7, 1983, Ser. No. 511,451**

**Claims priority, application Japan, Oct. 5, 1982, 57-150968[U]**

**Int. Cl.³ B62D** *25/06*

**U.S. Cl. 296—214** **13 Claims**



1. A vehicle body construction having an outer roof panel,

an inner roof panel located on the inner side of said outer roof panel, a weather strip attached to the end of said outer roof panel, a ceiling in the passenger compartment of the vehicle located on the inner side of said inner roof panel and a ceiling trim device for fixing said ceiling to said roof panels, wherein the improvement comprises:

the ceiling trim device is provided with a curved outer flange for concealing a gap between an inner edge of said weather strip and said inner roof panel and a curved inner flange for resiliently holding said ceiling to said roof panels; and

a plurality of clips are located between said ceiling trim device and said inner roof panel, each clip having a clasping end adjacent to, and inside of, said curved outer flange of the ceiling trim device and a biasing end located adjacent to, and inside of, said curved inner flange of the ceiling trim device, whereby said clasping end of each clip attaches to said inner roof panel and said biasing end of each clip, in conjunction with the curved inner flange of the ceiling trim device, upwardly resiliently holds said ceiling against said roof panels.

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**4,516,805**

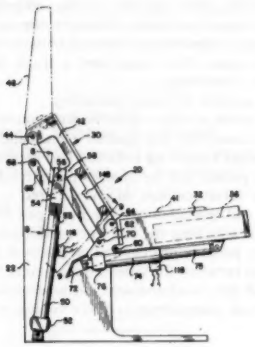
## MULTI-POSITION EXAMINATION CHAIR

**Marvin A. Leeper, Versailles; Richard L. Turner, Coldwater, both of Ohio, and Terry J. Simpkins, Snowmass Village, Colo., assignors to Midmark Corporation, Versailles, Ohio**

**Filed Feb. 15, 1983, Ser. No. 466,706**

**Int. Cl.³ A47C *1/02***

**U.S. Cl. 297—330** **9 Claims**



1. A multi-position examination chair for supporting a patient and assuming sequentially a plurality of examination positions which permit a plurality of standard obstetric and gynecologic examinations to be performed upon the patient, comprising:

base means for providing support;

a back portion supported by and pivotally attached to said base means;

first power means for pivotally moving said back portion into a desired position relative to said base means;

a seat portion;

mounting means pivotally attached to said back portion and pivotally attached to said seat portion;

linkage means for defining a pivotally connected quadrilateral having first, second, third and fourth sides, said first side being fixed with respect to said back portion, said second side being connected to said first side and fixed with respect to said mounting means, said third side being connected to said second side, and said fourth side being connected between said third and first sides and fixed with respect to said base means;

said linkage means causing a predetermined amount of pivotal movement of said mounting means relative to said base means in response to pivotal movement of said back portion;

second power means for pivotally moving said seat portion into a desired position relative to said mounting means;

a plurality of switch means, each such switch means associated with movement of said back and said seat portions from one of said examination positions to at least a next following one of said positions within said sequence; and

control means, responsive to said plurality of switch means, for controlling operation of said first and second power means in accordance with at least a portion of a predetermined sequence which results in said back and said seat portions moving through the steps of said sequence of said examination positions associated with the actuated switch means.

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**4,516,806**

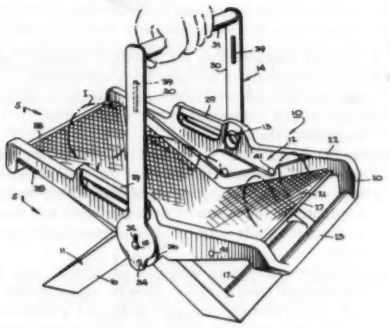
## PORTABLE INFANT CARRIER

**Quentin H. McDonald, 95 Morris La., Scarsdale, N.Y. 10583; Anthony P. Montalbano, Glen Cove, and Philip Sieczkowski, Woodside, both of N.Y., assignors to Quentin H. McDonald, Scarsdale, N.Y.**

**Filed Jan. 10, 1983, Ser. No. 457,022**

**Int. Cl.³ A47C *7/14, 7/16***

**U.S. Cl. 297—457** **8 Claims**



1. A carrier for an infant comprising

a contoured skeletal frame; and

a mesh body secured to and across said frame for receiving an infant thereon in a cradled manner, said mesh body being secured at each of two opposite sides to said frame and being separated from said frame at each of two opposite edges and at each end of each said edge to permit said mesh body to deform between said sides under the weight of an infant.

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**4,516,807**

## FLUID SUPPLY SYSTEMS FOR ROTARY CUTTER HEADS FOR MINING MACHINES AND ROTARY CUTTER HEADS COMPRISING FLUID SUPPLY SYSTEMS

**Brian A. Eagles, Johannesburg, South Africa, assignor to Coal Industry (Patents) Limited, London, England**

**Filed Sep. 21, 1982, Ser. No. 420,925**

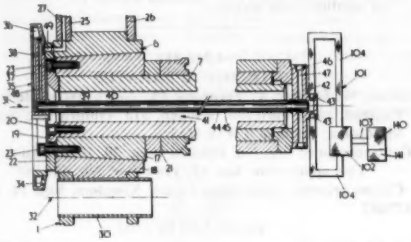
**Claims priority, application United Kingdom, Oct. 13, 1981, 8130875**

**Int. Cl.³ E21C *35/22, 35/04***

**U.S. Cl. 299—1** **5 Claims**

1. A fluid supply system for a rotary cutter head of a mining machine, comprising a fluid feed arrangement for feeding pressurized fluid from an inlet port on the mining machine along a tube extending axially of the rotary cutter head to a distributor block within the rotary cutter head mounted for

rotation therewith, the distributor block further defining a first and second passage means for low and high pressure fluids and a radially extending passage for said high pressure fluid in hydraulic connection with an annular passage extending



around the distributor block for fluid flow, and a plurality of nozzles adapted to emit air flow inducing sprays, the nozzles being provided on the distributor block in hydraulic connection with the annular passage defined by the distributor block.

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**4,516,808**

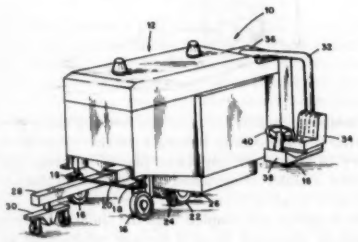
## PAVEMENT GRINDING APPARATUS

**Donald C. Staab, Warrington, Pa., and Clayton E. Farley, Lebanon, Tenn., assignors to MU, Inc., Lebanon, Tenn.**

**Filed Dec. 29, 1982, Ser. No. 454,423**

**Int. Cl.³ E01C *23/09***

**U.S. Cl. 299—39** **15 Claims**



1. A pavement grinding apparatus for moving across and grinding a paved surface comprising:

a main frame having a plurality of wheels supporting said main frame on the paved surface;

means for propelling said main frame across the paved surface in a direction defined as longitudinal which is perpendicular to a direction defined as lateral;

a subframe disposed adjacent said main frame;

at least one sliding connector attaching said subframe to said main frame for imparting substantially only horizontal longitudinal and lateral forces with respect to said main frame between said subframe and said main frame and for allowing substantially free vertical motion of said subframe relative to said main frame at the position of said sliding connector;

a grinding unit mounted on said subframe for grinding the paved surface at a selected grinding depth; and

at least one grinding unit roller mounted on said subframe for supporting said subframe at a selected elevation with respect to the paved surface to control the grinding depth of said grinding unit, said roller being operable to control the grinding depth of said grinding unit independently of the position of said main frame.

**4,516,809**

## DEVICE FOR INTERCONNECTING TWO SECTIONS OF A LONGWALL MINING MACHINE TRACK

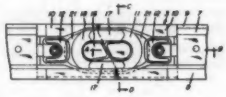
**Hugo Klimeck, Velbert, and Gerhard Wilken, Bochum, both of Fed. Rep. of Germany, assignors to Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Fed. Rep. of Germany**

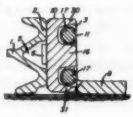
**Filed Sep. 8, 1983, Ser. No. 530,254**

**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1982, 323488**

**Int. Cl.³ E21C *35/12***

**U.S. Cl. 299—43** **3 Claims**





1. A device for interconnecting two sections of a longwall mining machine track secured to the side wall of a face conveyor, comprising lugs projecting outwardly from the sides of adjacent end portions of the respective track sections, an oval chain link element extending around said lugs and bridging the joint between the respective track sections, and fastening elements on the track sections for securing the chain link element in place, the chain link element being characterized in having horizontally-extending portions interconnecting semicircular end portions which extend around said lugs, the horizontally-extending portions being of larger cross-sectional areas than the semicircular end portions, whereby elongation of the interconnecting device is limited as is the separation between said adjacent end portions.

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**4,516,810**

## DUAL-CIRCUIT BRAKE CORRECTOR UNDER DECELERATION CONTROL

**Jean-Jacques Carré, Le Raincy, France, assignor to Societe Anonyme D.B.A., Paris, France**

**Filed Nov. 10, 1983, Ser. No. 550,426**

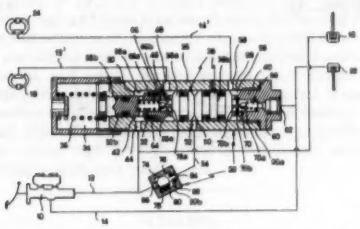
**Claims priority, application France, Nov. 23, 1982, 82 19573**

**Int. Cl.³ B60T *8/14***

**U.S. Cl. 303—24 F** **5 Claims**

1. Dual-circuit brake corrector under deceleration control for the brake system of a vehicle, comprising a housing (**26**) having a bore (**28**) therein, having two parts of large and small diameter (**28*a***, **28*b***) respectively, a stepped corrector piston (**32**) having a head (**32*a***) and a tail (**32*b***) sliding respectively in the parts of large and small diameter (**28**), a control piston (**38**) adjacent to the head (**32*a***) of the stepped piston and likewise sliding in the part of large diameter (**28*a***) of the bore, and a closure member (**40**) closing the bore (**28**) in a position opposite the control piston, a spring (**36**) bearing on the tail (**32*b***) of the stepped piston and urging the latter up against the control piston (**38**) and the control piston up against the said closure member (**40**), thus defining the rest position of the said pistons, a first inlet chamber (**42**) defined between the said stepped

piston (32) and the said bore (28*a*), a first outlet chamber (46) defined between the piston head (32*a*) and the control piston (38), a second outlet chamber (56) between the control piston (38) and the closure member (40), and a second inlet chamber (60) defined in the said closure member (40), the said inlet chambers being intended to be connected to the two outlets of a pressure generator of the tandem type (10), and the said outlet chambers being intended to be connected to rear brakes (18, 24) on each side of the vehicle, a first passage (64) between the first inlet chamber (42) and first outlet chamber (46), a



second passage (68) between the second inlet chamber (60) and second outlet chamber (56), a first and a second corrector valve (66, 70) in the said passages, the first (66) being controlled both by the said stepped piston (32) and by the said control piston (38), and the second (70) being controlled by the said control piston (38), characterized in that the said control piston (38) is made in two adjacent parts (38*a*, 38*b*) which define a control chamber (50) between them, the latter being connected to the first inlet chamber (42) via an isolating valve (20*b*) known per se, which is controlled by an inertial mass (78) sensitive to the deceleration of the said vehicle.

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**4,516,811**

**SLIDER MECHANISM FOR A VEHICLE SEAT**

**Yoshinori Akiyama, Yokohama; Shinichi Nishimura, Zama, and Isamu Harigaya, Tokyo, all of Japan, assignors to Nissan Motor Company, Ltd. and Ohi Seisakusho Company, Ltd., both of Yokohama, Japan**

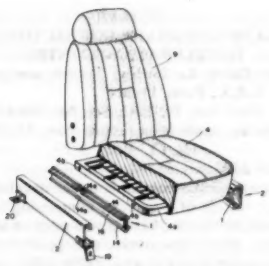
**PCT No. PCT/JP82/00208, § 371 Date Jan. 27, 1983, § 102(e) Date Jan. 27, 1983, PCT Pub. No. WO82/04228, PCT Pub. Date Dec. 9, 1982**

**PCT Filed May 28, 1982, Ser. No. 464,508**

**Claims priority, application Japan, May 29, 1981, 56-80724**

**Int. Cl.**[3] **B60N** *1/08;* **F16M** *13/00;* **F16C** *29/02*

**U.S. Cl. 308—3 R** **9 Claims**



1. A slider mechanism for a vehicle seat comprising:

a fixed rail which is fixed to a vehicle floor;

a movable rail which is fixed to a vehicle seat and so arranged as to slidingly engage said fixed rail; and

a pair of synthetic resin slider blocks, each of which is molded in place around an edge portion of one of said rails where said one of said rails slidingly contacts the other rail, each said slider block being integrally formed with a holding means permanently locked in a recess formed in said edge portion of said one of said rails to hold said slider block onto said one of said rails, and each of said slider blocks extending along approximately the overall length of the associated edge portion of said one of said rails and being formed with an intermediate discontinuous portion of smaller cross-section.

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**4,516,812**

**STORAGE APPARATUS**

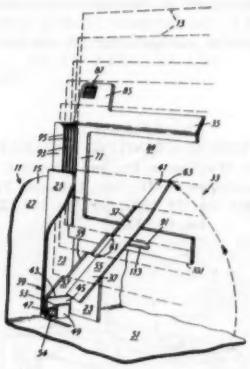
**Terence W. Gander, 47 Fernbank Pl., North Ascot, Berkshire, England, and Charles G. Widden, 313 Ashford Rd., Staines, Middlesex, England TW18 1QJ**

**Continuation of Ser. No. 410,020, Aug. 20, 1982, abandoned. This application Jun. 15, 1984, Ser. No. 621,067**

**Claims priority, application United Kingdom, Sep. 11, 1981, 8127482**

**Int. Cl.**[3] **G11B** *1/02*

**U.S. Cl. 312—12** **12 Claims**



1. Storage apparatus comprising a housing and a mechanism supported in the housing having a carrier adapted to hold a plurality of articles in respective planes, wherein the carrier comprises a slider constrained within the housing to move rectilinearly relative thereto and a lever pivotally connected with the housing and coupled with the slider for movement in conjunction therewith from a storage position to an access position, the carrier being adapted so as to displace articles rectilinearly along said respective planes and differentially relative to one another during movement thereof to the access position, and wherein retaining means are provided on the carrier and the position of the carrier is maintained when in the access position by the weight of articles held therein acting on the retaining means.

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**4,516,813**

**CABINET DOOR MOUNTING MECHANISM**

**Michael Sekerich, Spring Valley, N.Y., assignor to Grant Hardware Company, Wesy Nyack, N.Y.**

**Filed Apr. 11, 1983, Ser. No. 483,920**

**Int. Cl.**[3] **A47B** *87/02*

**U.S. Cl. 312—323** **3 Claims**

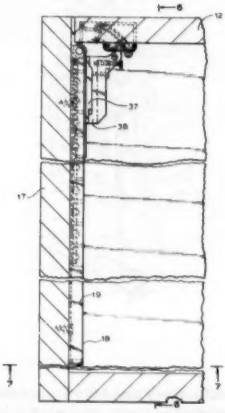
1. A cabinet structure comprising:

a cabinet body including top, bottom and side walls whose front edges delineate a rectangular front opening, the top wall having top and bottom faces;

a rectangular door corresponding in shape to said cabinet body front opening; and

coupling means swingably and slidably connecting said door and top wall; the improvement wherein said coupling means comprises an anchor member affixed to the under-

face of said top wall inwardly and proximate to said front opening, a bracket member, hinge means connecting said bracket member to said anchor member for swinging about a transverse axis between a vertical closed position depending from said anchor member and a horizontal open position projecting forwardly of and at about the level of said anchor member, said hinge means including a plurality of transversely spaced first hinge pins located on said anchor member, a plurality of transversely spaced second hinge pins located on said bracket member, a pair of link members extending between respective pair of said first and second hinge pins whereby said door in its open position is spaced above said top wall and a leaf spring



extending between a pair of said first and second pins and urging said door to its closed position when at less than a predetermined angle to the vertical, a follower mounted on and angularly adjustable relative to said bracket member and projecting upwardly when said bracket member is in open position and being below the level of said top wall when said bracket member is in closed position and a track affixed to the inside face of said door and forwardly rearwardly slidably engaging said follower whereby said door is swingable between a vertical closed position registering with said front opening and an open position above and parallel to said top wall and being forwardly and rearwardly slidable.

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**4,516,814**

## COUPLING DEVICE

**Hugh C. Ireland, Ayr, Scotland, assignor to Simplex-GE Limited, Ayr, Scotland**

**Filed Aug. 8, 1983, Ser. No. 521,426**

**Claims priority, application United Kingdom, Aug. 26, 1982, 8224586; Oct. 26, 1982, 8230568**

**Int. Cl.³ H01R** *35/00*

**U.S. Cl. 339—7** **5 Claims**

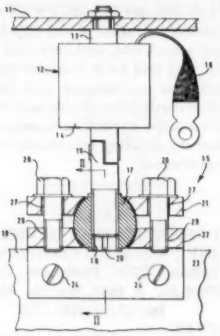
1. An adjustable electrical connection comprising

first and second electrical conductors each carrying respective first and second members of an electrically conducive coupling,

said first conductor has an externally screw-threaded part;

said first coupling member has an external clamping surface of curved configuration, an internal screw-threaded bore in which said threaded part of the first conductor is threadedly received in an axially adjustable manner, and a slot extending outwardly from said bore; and

said second coupling member comprises two clamping elements having respective recesses which face towards one another and define clamping surfaces which engage the clamping surface of the first coupling member over a range of positions of engagement, and releasable fastening members which are operable to draw the clamping elements towards one another and thereby clamp said elements onto the first coupling member and hold said sur-



faces at any selected position of engagement whilst simultaneously clamping the first coupling member onto said threaded part of the first conductor and holding said threaded part at any selected axial position.

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**4,516,815**

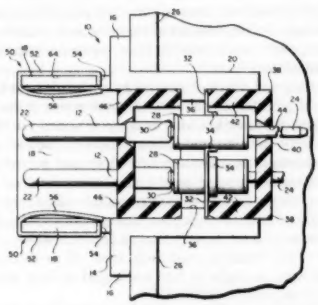
## RF FILTER CONNECTOR

**Thomas L. Venable; Geoffrey C. Robinson, both of Erie, and Raymond D. Loeslein, Fairview, all of Pa., assignors to Spectrum Control, Inc., Fairview, Pa.**

**Filed Jun. 7, 1982, Ser. No. 386,037**

**Int. Cl.³ H01R** *4/66, 15/06, 13/648*

**U.S. Cl. 339—14 R** **7 Claims**



1. A filter connector with electromagnetic (EMI) shielding comprising:

a housing formed of electrically conductive material and having at least one slot at one end of said housing;

a plurality of elongated contacts, each having a front contact engaging portion and a rear termination portion, locatable within said housing with said front contact engaging portion at said one end of said housing and said rear termination portion at the other end of said housing;

an EMI filter element mounted intermediate the front contact engaging portion and the rear termination portion on each of said contacts;

a conductive ground plate insertable into said housing adapted for conductive engagement with each of said EMI filter elements and said housing for conductively grounding any EMI on said contacts; and

a C-shaped spring clip member with the open end of the

C-shape engaging said slot and said clip mounted on said housing at said one end with a portion of the housing in the open end for reliably insuring electrical conductive engagement between respective housings when mated with another connector;

said spring clip member including a spring leaf arm formed as a continuous extension of and oppositely facing a latch arm having a hook end, said hook end insertably engaged in said slot, and said latch arm and spring leaf arm being clip mounted on said housing with said housing portion captured therebetween to enable said spring leaf arm to be depressed between respective housings during connector mating, thereby securing electrically conductive engagement therebetween.

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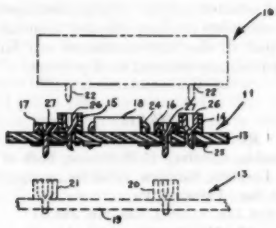
**4,516,816**

## IN CIRCUIT MODIFICATION DEVICE FOR DUAL IN LINE PACKAGED COMPONENTS

**Michael F. Winthrop, 727 W. Holly Ave., Sterling, Va. 22170**

**Filed Jan. 5, 1983, Ser. No. 455,714**
**Int. Cl.³ H05K *1/00***
**U.S. Cl. 339—17 CF** **5 Claims**



1. In a dual in line packaged large scale integration device having first and second rows of pins that plug into a companion device socket, the improvement residing in a circuit modification device, said circuit modification device comprising

a printed circuit board,

first and second rows of spaced apart header pins mounted on said printed circuit board, said rows of header pins constituting a socket and being positioned to receive respectively the first and second rows of pins of said large scale intergrating device, said first and second rows of spaced apart header pins being comprised of first and second single in line packaged solder tail devices,

a first row of feedthrough pins juxtaposed with said first row of header pins and comprising a feedthrough pin for each header pin therein, said first row of feedthrough pins comprising a single in line packaged device having integrated circuit pin terminals,

a second row of feedthrough pins juxtaposed with said second row of header pins and comprising a feedthrough pin for each header pin therein, said second row of feedthrough pins comprising a single in line packaged device having integrated circuit pin terminals, said first and second rows of feedthrough pins extending through said printed circuit board and constituting a plug connection to mate with said companion device socket,

electrical connection means interconnecting header pins and feedthrough pins in a preselected arrangement, said electrical connection means comprising a discrete printed circuit on said printed circuit board, and

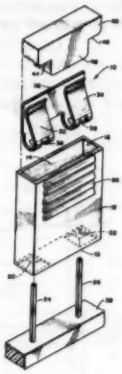
at least one integrated circuit component having connector pins mounted on said printed circuit board between said first row of header pins and said second row of feedthrough pins, said integrated circuit component connector pins extending through said printed circuit board, said connector pins being electrically interconnected with said feedthrough pins in a preselected arrangement.

**4,516,817**

## ELECTRICAL JUMPER ASSEMBLY

**Paul M. Deters, 2105 Harkness St., Manhattan Beach, Calif. 90266**

**Filed Apr. 25, 1983, Ser. No. 488,165**
**Int. Cl.³ H01R *31/08***
**U.S. Cl. 339—19** **11 Claims**



1. An electrical jumper assembly for establishing an electrical connection between a pair of spaced-apart terminal posts comprising:

a housing, said housing having an internal chamber enclosed by a side wall assembly, said side wall assembly terminating in a top wall and a bottom wall, a first opening arrangement formed within said top wall, a second opening arrangement formed within said bottom wall, an electrical conducting bar, said bar having a spring biased clip assembly, said clip assembly forming two in number of clips located in a spaced-apart manner, said bar being totally located within said internal chamber in a closefitting manner, each said clip assembly to engage with a said terminal post and be spring biased in a continuous contact therewith;

retaining means connected with said housing for holding said bar in position within said internal chamber;

said internal chamber having a wall surface, said first opening arrangement having a periphery in alignment with said wall surface;

said second opening arrangement comprising two separate spaced-apart openings, a said terminal post being adapted to be conducted through each said separate spaced-apart openings;

each said clip being basically U-shaped in configuration and defining a pair of spaced-apart leg members, one of said leg members being integrally attached to said bar, the other of said leg members having an outer free end, each said clip having a apex interconnecting said leg members, each said apex to be located directly adjacent said second opening arrangement;

each said apex including an access opening, a said terminal post to extend through said access opening to be biasingly held between said legs of said clip; and

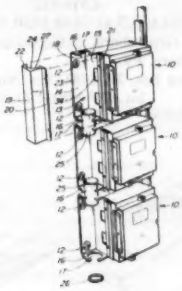
a plug located in a closefitting manner within said first opening arrangement, said plug having recesses formed at each longitudinal end thereof, a said terminal post to be locatable within a said recess.

4,516,818

## ENTRANCE TERMINAL FOR TELECOMMUNICATIONS CABLES

Harold Johnston, Dorval, and Richard E. Benoit, Longueuil, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Dec. 21, 1982, Ser. No. 451,811
Int. Cl.³ H01R *13/44*
U.S. Cl. 339—36 12 Claims



1. An entrance terminal for telephone cables, comprising:

a housing, including a cable trough extending down one side of the housing, the housing including a back part and a front part hingedly connected to the back part at a side opposite to that of said trough;

said trough comprising a back member extending laterally from the back of the housing, a side member formed by a side of the housing, an end wall at each end of the trough, and a circular aperture in each end wall, the aperture breaking through an edge of the end wall to form a gap;

an interconnect block in said back part of said housing, and apertures in said side member of said trough for passage of conductors laterally from said trough to said interconnect block;

a plurality of elongate terminal strips mounted in said interconnect block and a plurality of terminal members spaced along each terminal strip and extending through said terminal strip, a back end of each terminal member accessed from the rear of the interconnect block and a front end of each terminal member accessed from the front of the interconnect block, conductors fed from said trough connected to the front ends of said terminal members;

the front portion having a protector module block mounted therein;

a plurality of terminal pins in said protector module block and extending from a rear surface of the protector module block;

means for feeding conductors from the back ends of the terminal members to preselected ones of said terminal pins;

means for mounting protector modules on a front surface of the protector module block, said means including terminals connected to said terminal pins and adapted to receive terminals on said protector modules;

a cover removably mounted on said trough to form an enclosure for passage of conductors of a cable along said trough; and

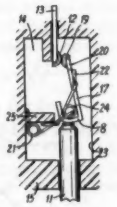
a hinged front cover on said front part of said housing.

4,516,819

## MAKE AND BREAK ELECTRICAL CONNECTOR

Yves Le Magourou, Ermont, France, assignor to Societe d'Exploitation des Procedes Marechal, Paris, France

Filed Aug. 3, 1983, Ser. No. 519,868
Claims priority, application France, Aug. 9, 1982, 82 13891
Int. Cl.³ H01R *13/635*
U.S. Cl. 339—46 12 Claims



1. A pressure contact adapted to establish an electrical connection between a movable conductive connector-pin rigidly attached to a support and a stationary contact bead electrically connected to an input terminal and located within a plug socket chamber, when said connector-pin is axially introduced into said plug socket chamber, said support and said socket including means for guiding said connector pin into said socket, said pressure contact comprising:

(a) a rigid and movable conductive member located within said plug socket chamber, said conductive member adapted to be biased towards an end wall of said chamber by continued axial movement of a free end of said connector-pin, said rigid conductive member including a heel at one end thereof which is contacted by said connector-pin free end as it moves longitudinally through said chamber;

(b) first resilient means for biasing said heel against the edge of a bore located within said chamber;

(c) means for guiding said movable member in a first direction which is substantially parallel to the axis of said member, until an end of said member which is located remote from said heel is substantially longitudinally aligned with said stationary contact bead; and

(d) second resilient means for biasing the rigid conductive member away from said guiding means to tilt a movable contact bead at said remote end of said rigid conductive member forwardly and into abutment with said stationary contact bead, said second resilient means further comprising means for assisting in the separation of said movable contact bead from said stationary contact bead when said plug connector-pin is withdrawn from said chamber.

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4,516,820

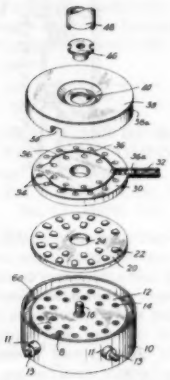
## COCHLEAR PROSTHESIS PACKAGE CONNECTOR

Janusz Kuzma, Stanmore, Australia, assignor to The Commonwealth of Australia, Australia

Filed Jan. 27, 1983, Ser. No. 461,617
Int. Cl.³ H01R *25/00*
U.S. Cl. 339—48 10 Claims

1. A connector arrangement for connecting to each other first and second parts of a cochlear prosthesis, said first part having an hermetically sealed case adapted to contain an electronic circuit therein and said second part having a plurality of conductors extending therefrom; each of said first and second parts having a carrier with a plurality of noble-metal conducting hollow-tube feedthroughs extended therethrough and hermetically sealed thereto by reaction bonds; the two pluralities of feedthroughs having alignable patterns; a deformable sheet permanently adhered to the carrier of said first part and having a plurality of noble-metal foil contacts extending through respective slits each having its two ends bent over so that they lie flush against respective faces of said sheet, said

plurality of contacts having a pattern which is alignable with the patterns of the feedthroughs in said two pluralities; each of said feedthroughs being open at that end which faces said deformable sheet and the face of each of said carriers which is disposed adjacent to said deformable sheet being lapped to a mirror finish; a screw extending outwardly of the carrier of said first part and passing through a central hole in the carrier of said second part for securing said sheet between said first and second parts to allow said plurality of contacts to establish



electrical connections between respective ones of the feedthroughs in said two pluralities; said second part including a backing plate having a central hole therein, and said securing means further including a nut screwable onto the end of said screw which extends through said backing plate hole; and a plurality of conductors connected to respective ones of the feedthroughs in said second part, said plurality of conductors being wound in the form of a spiral and exiting said second part through an additional hole in said backing plate.

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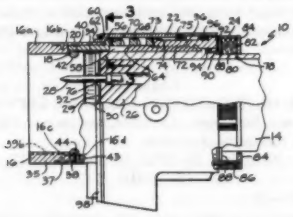
**4,516,821**

## ELECTRICAL CONNECTOR LOCKING MECHANISM

**Gerald R. Nieman, Glendale, Ariz., assignor to International Telephone & Telegraph Corporation, New York, N.Y.**

**Filed Jun. 28, 1982, Ser. No. 393,094**
**Int. Cl.³ H01R *13/62***
**U.S. Cl. 339—75 M** **21 Claims**



1. An electrical connector member adapted to mate with a second connector member having a shell formed with a circular locking groove, comprising:

a housing having an insulator therein containing a plurality of electrical contacts;

a sleeve extending forwardly from said housing adapted to telescopically engage with said shell,

a resilient lock ring carried by said sleeve and being located inside said sleeve;

in its unstressed condition said ring having its outer periphery spaced from a surface of said sleeve providing a gap therebetween and its inner periphery dimensioned to fit into said locking groove in locking engagement therewith;

said ring being capable of deflecting radially outwardly toward said sleeve surface when the connector member is engaged with or disengaged from said second connector member;

a plurality of axially movable lock pins slidable into said gap for locking said ring in said locking groove when said connector members are mated; and

means for axially shifting said lock pins between a forward locking position in said gap and a rear release position behind said ring.

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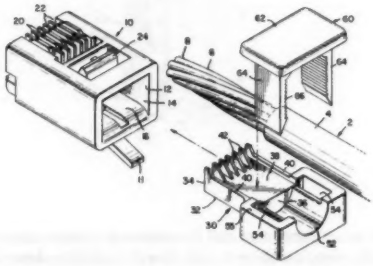
**4,516,822**

## ROUND CABLE ADAPTOR FOR MODULAR PLUG

**Lee A. Wolfel, Greensboro, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 27, 1984, Ser. No. 584,199**
**Int. Cl.³ H01R *13/58***
**U.S. Cl. 339—103 M** **4 Claims**



1. An adaptor for terminating round multiconductor cable to a modular phone plug of the type having an input aperture leading to a cavity, conductor aligning troughs in the floor of the cavity remote from the aperture, terminals in slots aligned above the troughs, and a hinged anchoring member above the cavity towards the aperture, the adaptor comprising:

a base having a planar portion bounded by a first end, an opposed second end, and a planar surface extending therebetween, said base having comb means upstanding from said planar surface at said first end, said planar portion being profiled for reception in said cavity of said plug with said comb means adjacent said troughs,

said comb means comprising partitions which space conductors laid on said planar surface in alignment with said troughs, whereby conductors extending through said comb means and beyond said first end will overlie respective troughs when said planar portion is received in said cavity, said comb means being captured in said cavity and said conductors being captured between said anchoring member and said planar surface when said anchoring member is hinged down into anchoring position.

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**4,516,823**

## LOADBREAK BUSHING AND SNUFFER/CONTACT ASSEMBLY THEREFOR

**Reinhard Filter, 14 Charles St., Georgetown, Ontario, Canada L7G 2Z2, and Donald J. Stonkus, 271 Lakeview Ave., Burlington, Ontario, Canada L7N 1Y7**

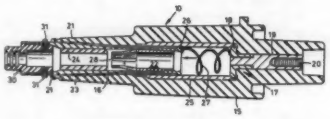
**Filed Dec. 7, 1983, Ser. No. 559,095**
**Claims priority, application Canada, Sep. 19, 1983, 436950**
**Int. Cl.³ H01R *13/53***
**U.S. Cl. 339—111** **14 Claims**

1. For a loadbreak bushing comprising an insulating housing having an axially extending bore therein, and terminal contact means closing one end of the bore, the other end of the bore being open to receive a terminator probe, the housing having

an end portion providing radial abutment means adjacent said open end of the bore:

a snuffer/contact assembly adapted to be supported within the bore for reciprocal movement therealong, the snuffer/contact assembly being axially displaceable from a first seated position to a second position in response to prestrike arcing under fault conditions,

the snuffer/contact assembly comprising a tubular insulating sleeve having an inner end portion carrying a bore contact and an outer end portion adapted to cooperate with said end portion of the housing,



electrically conductive means providing a current path between said bore contact and the terminal contact means, and

gas-actuated radial lockout means carried by said outer end portion of the sleeve, said lockout means being responsive to the generation of gas pressure within the bore and engageable with said abutment means of the housing end portion when the snuffer/contact assembly is in the second position thereby to prevent return of the snuffer/contact assembly to the first position.

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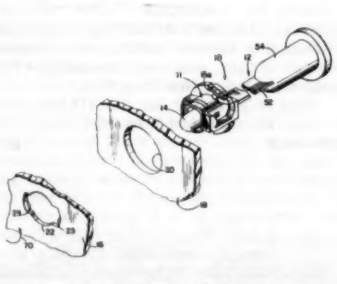
**4,516,824**

## LAMP SOCKET ASSEMBLY FOR MOUNTING ON PRINTED CIRCUIT BOARD

**Ray F. Winogrocki, East Detroit, Mich., and Daniel J. DuRocher, Nauvoo, Ill., assignors to Essex Group, Inc., Fort Wayne, Ind.**

**Filed Dec. 14, 1983, Ser. No. 561,421**
**Int. Cl.³ H02B** *1/02*
**U.S. Cl. 339—126 R** **11 Claims**



1. A lamp socket assembly adapted to be mounted on one side of a printed circuit with a tubular portion thereof extending through a small aperture with cutouts in the printed circuit, comprising:

a socket having a substantially tubular portion thereof of small diameter adapted to extend forwardly through said aperture in said printed circuit for receiving a lamp having electrical lead means;

a key member adapted to receive said socket in latched relation therewith near the forward end of said key member;

a base flange formed near the rearward end of said socket, at least part of said flange being of greater diameter than at least part of said aperture in said printed circuit and including a forward-facing surface for supporting said lamp electrical lead means thereon for contact with a rearward-facing surface of the printed circuit;

said key member and said socket including complementary latching means for latching said socket to said key member in a manner allowing limited relative longitudinal displacement therebetween;

biasing means being integrally formed with one of said key member and said socket and disposed to engage the other of said key member and said socket for urging said socket forward longitudinally relative to said key member; and

said key member including a securing member disposed thereon for insertion into said printed circuit aperture and subsequent twisting with said key member to lock said socket assembly on said printed circuit board such that said socket flange urges the lamp electrical lead means into said contact with the printed circuit board.

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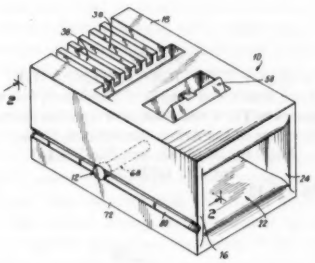
**4,516,825**

## MODULAR CONNECTOR FOR TERMINATING EMI/RFI SHIELDED CORDAGE

**Robert J. Brennan, Ossining, and Terrence Meighen, Stormville, both of N.Y., assignors to Stewart Stamping Corporation, Yonkers, N.Y.**

**Filed Jul. 11, 1983, Ser. No. 512,375**
**Int. Cl.³ H01R** *13/658*
**U.S. Cl. 339—143 R** **10 Claims**



1. A modular plug connector for terminating a shielded cord having a plurality of insulated conductors enclosed within an outer jacket and a shield sheath between the jacket and conductors and enclosing the latter substantially along their length, comprising: a dielectric housing having a top wall and side walls defining a forward free end and a rearward cord input end having an aperture formed therein opening into a longitudinally extending cord-receiving cavity formed within the housing, said cord-receiving cavity having a forward conductor-receiving portion and a rearward jacket-receiving portion, a plurality of slot-like openings formed through said housing top wall adapted to receive flat contact terminals, each of said openings being aligned with a corresponding conductor upon termination of a cord; and means formed of electrically conductive material extending through at least one of said housing side walls for terminating the cord shield sheath, said cord shield sheath terminating means having an inner portion situated in said cord-receiving cavity extending transversely therein adapted to make electrical contact with the cord shield sheath and an outer portion situated externally of said housing.

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**4,516,826**

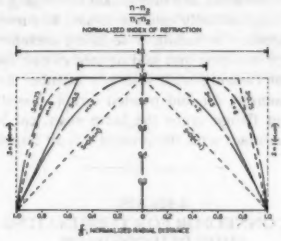
## SINGLE MODE LIGHTGUIDE FIBER HAVING A TRAPEZOIDAL REFRACTIVE INDEX PROFILE

**Un-Chul Paek, West Windsor Township, Mercer County, N.J., assignor to AT&T Technologies, Inc., New York, N.Y.**

**Filed Apr. 21, 1983, Ser. No. 487,402**
**Int. Cl.³ G02B** *5/172*
**U.S. Cl. 350—96.31** **3 Claims**

3. A graded refractive index single mode lightguide fiber, wherein:

the gradation of the refractive index, which is a function of the radial position transverse to the central longitudinal



axis of the fiber, has a trapezoid shape with an upper base to lower base ratio between 0 and 0.3.

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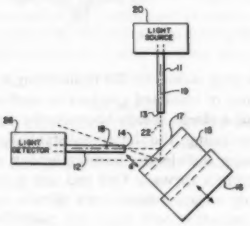
**4,516,827**

## VARIABLE OPTICAL ATTENUATOR

**Clyde E. Lance, Riner, and Wanda S. Hutchison, Salem, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jul. 16, 1982, Ser. No. 399,153**
**Int. Cl.³ G02B *5/14***
**U.S. Cl. 350—96.15** **7 Claims**




1. A variable optical attenuator comprising:

first and second optical fibers having respective longitudinal axes disposed at an angle and a pair of respective ends positioned adjacent and spaced from one another, said first fiber having an output face at one said end for emitting light, said second fiber having an input face at said adjacent end for collecting light;

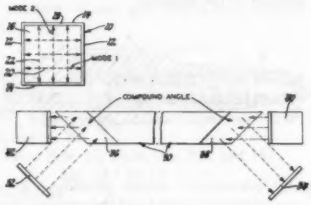
light beam director means having a uniformly reflective surface positioned proximate to and spaced from said ends for reflecting light emitted from said output face to said input face and having a longitudinal axis extending in a direction between said axes of said fibers; and adjustable holding means for supporting and mechanically adjusting movement of said light beam director to and fro along the longitudinal axis thereof to a continuously selectable position in a path between said end faces to determine the spacing of said reflective surface from said ends and the amount of light incident upon said input face, said adjustable holding means having a longitudinal axis coinciding with said light beam director axis, the entire length of said adjustable holding means being freely moveable therealong.

**4,516,828**

## DUPLEX COMMUNICATION ON A SINGLE OPTICAL FIBER

**Robert E. Steele, Cortland, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 3, 1982, Ser. No. 374,406**
**Int. Cl.³ G02B *5/14***
**U.S. Cl. 350—96.16** **4 Claims**




1. A multiplex optical fiber capable of simultaneously transmitting information in the form of light in the same direction or in opposite directions between transmitting and receiving locations comprising:

a substantially rectangular cross section optical fiber having two pairs of parallel internally reflective sides defining first and second orthogonally related light propagating channels;

and transmitting and receiving light coupling means at said locations for each channel constructed and arranged to couple light to and from the respective channels in a manner to provide propagation in the two channels whereby each channel of the fiber transmits light energy between respective transmitting and receiving locations without substantial interference from the other.

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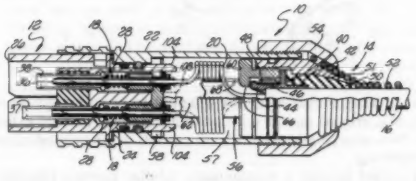
**4,516,829**

## FIBER OPTIC CONTACT RETENTION ASSEMBLY

**Leslie M. Borsuk, Los Alamitos, and Patrick G. Corrales, Garden Grove, both of Calif., assignors to International Telephone & Telegraph Corporation, New York, N.Y.**

**Filed May 12, 1982, Ser. No. 377,302**
**Int. Cl.³ G02B *5/14, 7/26***
**U.S. Cl. 350—96.20** **13 Claims**



1. A fiber optic contact retention assembly comprising:

a fiber optic contact having spaced shoulders thereon facing each other;

a yoke having a slot therein extending axially therethrough and opening at its outer periphery;

said contact being mounted radially inwardly into said slot with one shoulder engaging one side of said yoke and the other shoulder being spaced outwardly from the other side of said yoke;

resilient means between said other shoulder and said other side of said yoke; and

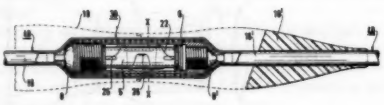
said resilient means being compressed between said other shoulder and said other side of said yoke.

4,516,830

# JUNCTION FOR JOINING THE ENDS OF TWO UNDER WATER OPTICAL FIBER CABLES, AND METHOD OF MANUFACTURE

Lucien Guazzo, Calais, France, assignor to Les Cables de Lyon, France

Filed Dec. 28, 1982, Ser. No. 453,868
Claims priority, application France, Dec. 30, 1981, 81 24514
Int. Cl.³ G02B 5/14, 5/16
U.S. Cl. 350—96.22 16 Claims



1. A junction for joining the ends of two under water optical fiber cables, each cable comprising an optical core inside a protective arch of helically wound steel wires, a copper tube swaged down on the arch, and an insulating outer sheath covering the copper tube, the junction comprising two cable-receiving end portions for receiving respective ends of the two cables to be joined and a central portion for interconnecting said end portions, and wherein each end portion comprises:

an anchor member at least partially made of high strength metal, said anchor member having an axially extending cable-receiving bore passing therethrough, said bore having a cable-exit end and a cable-insertion end, a conically flared portion at said cable-exit end and a cylindrical portion at said cable-insertion end, said cylindrical portion having a diameter sized to closely receive the end of a cable stripped down to its copper tube; and

a cable-retaining conical wedge member fitted in the conical portion of the anchor member bore, the outer conical surface of the wedge member being configured and sized for co-operating with the conical surface of the anchor member bore to wedge the steel wires of the cable when splayed out between said conical surfaces, a setting synthetic resin filling voids between and around the steel wires, said wedge member further having an axial bore for passing the optical core of the cable through to the central portion of the junction;

the improvement wherein the central portion of the junction comprises:

an inner mandrel mounting connections between individual pairs of optical fibers and an outer tube mechanically interconnecting the anchor members, the inner mandrel being received, when the junction is assembled, inside the outer tube between the anchor members, and means for anchoring said mandrel to at least one of said anchor members to prevent the mandrel from rotating or moving axially relative to the anchor members;

the mandrel being open at both ends and receiving the optical fiber cores of the cables to be joined where they leave the axial bores of the wedge members, at said open ends, said optical fibers from each of the cores passing into respective mandrel at said open ends and through a plurality of radial fiber passing holes through the wall of said mandrel to the outside surface of said mandrel, end-to-end connections joining said optical fibers from each of the cores and said optical fibers at said end-to-end connections being wrapped around the outside of said mandrel after end-to-end connection with corresponding optical fibers from the other core; and

the outer tube being made of a high strength metal, having a bore that leaves a clearance around the mandrel, having means for fastening said anchor members to each end thereof, and being covered in a layer of insulating material and closure mouldings of thermoplastics material cast over the ends of the anchor members after the junction has been used to interconnect two cables for continuing the insulating outer sheaths of the cables, such that the optical fibers of the cables are connected end-to-end with enough slack optical fiber to avoid breakage in the event of traction being applied to the cable, the structural protective arches of the steel wires on the two cables are mechanically joined with sufficient strength to withstand the traction to which the cable is subjected during handling, and wherein the junction is watertight even against high pressure at the bottom of the ocean.

11. A method of joining two optical fiber cable ends wherein each cable comprises an optical core inside a protective arch of helically wound steel wires, a copper tube swaged down on the arch, and an insulating outer sheath covering the copper tube, a junction for joining the ends of the fiber cables, said junction comprising two cable-receiving end portions for receiving respective ends of the two cables to be joined and a central portion for interconnecting said end portions, and wherein each end portion comprises an anchor member at least partially made of high strength metal, said anchor member having an axially extending cable-receiving bore passing therethrough, said bore having a cable-exit end and a cable-insertion end, a conically flared portion at said cable-exit end and a cylindrical portion at said cable-insertion end, said cylindrical portion having a diameter sized to closely receive the end of a cable stripped down to its copper tube; and a cable-retaining conical wedge member for fitting in the conical portion of the anchor member bore, the outer conical surface of the wedge member being configured and sized for co-operating with the conical surface of the anchor member, the central portion of the junction comprising an inner mandrel for mounting connections between individual pairs of optical fibers and an outer tube for mechanically interconnecting the anchor members, and means to prevent the inner mandrel from rotating or moving axially relative to the anchor members, the mandrel being open at both ends to receive the optical fiber cores of the cables to be joined, having a plurality of fiber passing holes through its wall near each end thereof, the outer tube being made of a high strength metal having a bore that leaves a clearance around the mandrel; said method comprising the following steps:

(a) stripping the ends of the cables to bare lengths of their optical fibers which are considerably longer than the length of the junction;

(b) engaging the outer sleeves, the outer tube, and the anchor members in that order over the ends of the cables;

(c) cutting the arch-forming steel wires, the copper tubes and the outer sheaths of the cables to suitable lengths;

(d) inserting a quantity of setting resin into the conical bores of the anchor members and splaying the steel wires out in the conical bores;

(e) inserting the conical wedge members to wedge the steel wires in the anchor members, and filling voids between and around the steel wires with setting resin, and setting the resin;

(f) threading the optical fibers to be joined end to end through the end openings of the mandrel and then out through its fiber passing holes, and putting the mandrel in place between the anchor members;

(g) interconnecting the optical fibers end to end and wrapping the surplus length of optical fiber around the mandrel;

(h) placing the outer tube over the mandrel and fixing its ends to the anchor members;

(i) filling the inside of the mandrel and the clearance between the mandrel and the outer tube via filler orifices provided through the anchor members with viscous material; and

(j) casting the closure mouldings over the ends of the anchor members and the adjacent portions of cable.

## 4,516,831
## LIGHT CONDUCTING CABLE INCLUDING A HEAT REMOVABLE LAYER FOR PREVENTING TENSION AND A METHOD OF MAKING SAME

**Rolf Meistring, Glonn; Hans-Friedrich Siegling, Egmating, and Siegfried Pfahl, Hagen, all of Fed. Rep. of Germany, assignors to Heermann GmbH, Hagen, Fed. Rep. of Germany**

**Filed Jul. 28, 1982, Ser. No. 402,997**

**Claims priority, application Fed. Rep. of Germany, Aug. 22, 1981, 3133274**

**Int. Cl.³ G02B 5/14**

**U.S. Cl. 350—96.23** **12 Claims**

1. A light conducting cable suitable for winding onto a reel and rapidly unwinding from the reel, comprising a light conducting optical fiber (1 or 11) centrally located in the cable, a protective coating (2 or 12) surrounding the light conducting optical fiber for protecting the fiber, an outer casing (5 or 15) surrounding said protective coating and a certain free space between said protective coating (2 or 12) and said outer casing (5 or 15) for preventing tension and/or compression loads from affecting the transmission characteristic of the cable, said cable further comprising a layer (4, 14) of heat removable material substantially entirely surrounding said light conducting optical fiber for a limited time inside said free space between said outer casing and said protective coating, and wherein said outer casing is permeable to said heat removable material of said layer substantially along the entire length of said outer casing for the removal or partial removal of said layer of heat removable material through the permeable outer casing substantially along the entire length of said cable for providing said free space inside said cable substantially along its entire length when said heat removable material of said layer (4, 14) has been removed through said outer casing by heating the cable.

9. A method of producing a light conducting cable, comprising the following steps: coating a light conducting fiber with a protective coating, enclosing said protective coating with a layer of heat removable material, surrounding said layer of heat removable material by an outer casing which is permeable substantially along its entire length to said heat removable material when the latter is heated, said outer casing protecting said light conducting cable, and heating said cable sufficiently for at least partially removing said heat removable material through said permeable outer casing substantially along the entire length of said cable to thereby provide a certain free space in said cable along its entire length to prevent tension and/or compression loads effective on said outer casing from affecting the transmission characteristic of the cable.

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## 4,516,832
## APPARATUS FOR TRANSFORMATION OF A COLLIMATED BEAM INTO A SOURCE OF REQUIRED SHAPE AND NUMERICAL APERTURE

**Kantilal Jain, and Milton R. Latta, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 23, 1982, Ser. No. 391,099**

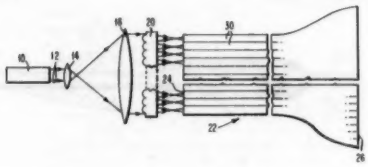
**Int. Cl.³ G02B 5/14**

**U.S. Cl. 350—96.24** **17 Claims**

1. Apparatus for producing a line source of a predetermined shape and numerical aperture from a collimated light source comprising:

first optical means for directing a collimated light source along a predetermined path;

second optical means fixed in position along said predetermined path so that said light source impinges upon said second optical means, said second optical means comprising a two dimensional lens array having multiple lenses in each of said two dimensions, said light source simultaneously impinging on all of the lenses of said lens array to




form a plurality of sources having a predetermined numerical aperture;

an optical fiber array, said fiber array having the input end of each of the fibers of said array positioned to receive the light from a different one of the lenses of said lens array to produce a plurality of self-luminous sources; and

means for positioning the other end of each of said optical fibers to produce a self-luminous source of said predetermined shape and numerical aperture.

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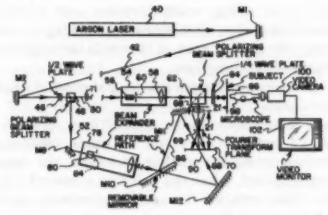
## 4,516,833
## PRODUCTION OF HIGH PERFORMANCE OPTICAL SPATIAL FILTERS

**Richard L. Fusek, Dayton, Ohio, assignor to University of Dayton, Dayton, Ohio**

**Filed Dec. 27, 1982, Ser. No. 453,408**

**Int. Cl.³ G03H 1/16; G02B 5/22**

**U.S. Cl. 350—162.12** **18 Claims**




1. A method of producing an optical spatial filter corresponding to a subject disposed within a subject plane, comprising the steps of:

directing a first coherent beam of light at said subject such that said light is diffracted and/or reflected thereby, whereafter said light contains optical information regarding said subject;

focusing said light containing said subject information so as to define a Fourier transform plane;

disposing a first optical recording means at said Fourier transform plane and exposing said recording means with said light containing said subject information;

recording upon said first recording means at least partially opaque areas corresponding to at least a portion of said subject information as said information appears within said transform plane;

attenuating at least a portion of said subject information by directing said light containing said information through said first recording means located within said transform plane;

directing a second coherent beam of light, through a holo-

graphic recording plane located beyond said transform plane, from a first direction so as to form an interference pattern in said recording plane with said light containing said subject information minus said information partially attenuated by said first recording means;

recording at said recording plane a first hologram of said partially attenuated subject information;

removing said first beam;

removing said first recording means from said transform plane;

disposing a second optical recording means at said transform plane;

redirecting said second beam through said hologram at said recording plane from a second direction opposite said first direction, whereby said second recording means is exposed with light from said second beam containing optical information from said hologram; and

recording upon said second recording means at least partially opaque areas corresponding to at least a portion of said hologram information as said information appears within said transform plane.

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**4,516,834**

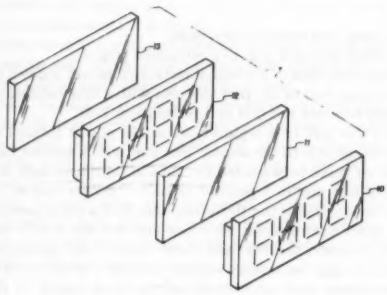
## CONTRAST ENHANCED LIQUID CRYSTAL DISPLAY

**Michael R. Cascini, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Apr. 8, 1983, Ser. No. 483,402**

**Int. Cl.³ G02F *1/13***

**U.S. Cl. 350—335** **10 Claims**



1. A liquid crystal display comprising two distinct liquid crystal displays in a spaced parallel relationship and having a transflector disposed interjacent said displays.

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**4,516,835**

## LIQUID CRYSTAL DISPLAY SYSTEM

**Ryoichi Suzuki, Kanagawa; Seiichi Matsumoto, Yokohama; Takashi Amikura, Tokyo; Tokuichi Tsunekawa, and Takashi Uchiyama, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 768,432, Feb. 14, 1977, abandoned. This application Jan. 23, 1979, Ser. No. 5,763**

**Claims priority, application Japan, Feb. 17, 1976, 51-16296; Feb. 20, 1976, 51-17756; Feb. 24, 1976, 51-19136**

**The portion of the term of this patent subsequent to Feb. 20, 1996, has been disclaimed.**

**Int. Cl.³ G02F *1/13***

**U.S. Cl. 350—336** **15 Claims**

1. A liquid crystal display system to display photographic information of a camera, comprising:

(A) a liquid crystal device including:

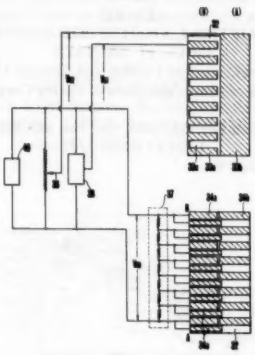
(a) a continuous transparent first electrode and a first transparent base plate which transmits light for supporting said electrode;

(b) a plurality of transparent second electrodes, a second transparent base plate for supporting the second electrodes with intervals from each other;

(c) a liquid crystal material sandwiched between said continuous transparent first electrode and said second electrodes and arranged to exhibit an electro-optical effect;

(B) resistance means including a plurality of resistors connected in series, each one of said resistors being connected between the second electrodes;

(C) power means to supply power to said resistance means; and



(D) information output means for applying an electrical signal corresponding to exposure information of a camera to said continuous transparent first electrode;

(E) the electrical signal corresponding to exposure information and being applied to said continuous transparent electrode in the liquid crystal display system having a relationship to the power means impressed to both ends of said resistance means such that only a portion or zone of the above-mentioned transparent electrode can be visually recognized.

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**4,516,836**

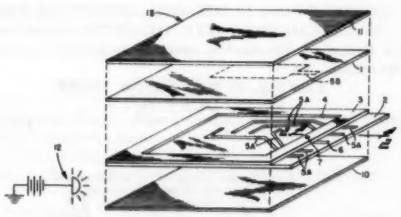
## CONDUCTOR FOR USE IN ELECTRO-OPTICAL DISPLAYS

**Joseph P. Ferrato, Stow, Ohio, assignor to Crystaloid Electronics Company, Hudson, Ohio**

**Filed Sep. 20, 1982, Ser. No. 419,880**

**Int. Cl.³ G02F *1/13***

**U.S. Cl. 350—336** **17 Claims**



1. An improved electrically conductive material for use in providing electrical interconnections in an electro-optical display, comprising:

said material characterized as being resilient and having the ability to maintain a continuous electrical contacting relationship while the display is subjected to temperature cycling of from about −30° C. to about 80° C. as a result of said material comprising a resilient blend of a resin

selected from the group consisting of epoxy and thermoplastic phenoxy resins and mixtures thereof with an amount of electrically conductive particles sufficient to impart said electrical interconnections with a resistance of from about 1 ohm to about 20 ohms and consisting essentially of from about 10 percent to about 40 percent by weight based upon the total weight of said glycol and said resin of an organic glycol so that said material maintains continuous flexible and electrical contact during the temperature cycling.

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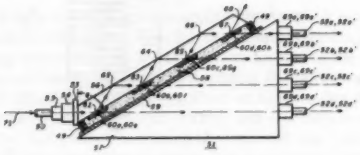
**4,516,837**

## ELECTRO-OPTICAL SWITCH FOR UNPOLARIZED OPTICAL SIGNALS

**Richard A. Soref, Newton Centre, and Donald H. McMahon, Carlisle, both of Mass., assignors to Sperry Corporation, New York, N.Y.**

**Filed Feb. 22, 1983, Ser. No. 468,526**
**Int. Cl.³ G02F *1/13***
**U.S. Cl. 350—347 V** **20 Claims**



1. An optical switch comprising:
(a) polarizing beam splitter means having first and second faces, for separating an incident light beam of arbitrary polarization into first and second light beams with first and second orthogonal linearly polarized states respectively, said first light beam refracted to propagate along a first path, and said second light beam refracted to propagate along a second path,
(b) first reflector means positioned to deflect said second light beam along a path parallel to said first path,
(c) first polarization converter means positioned in said second path for rotating said light beam polarization from said second linearly polarized state to substantially said first linearly polarized state, and
(d) first and second electrically responsive path selector means positioned in said parallel paths of said first and second light beams for selecting one of a first plurality of optical paths for said first light beam and one of a second plurality of optical paths for said second light beam.

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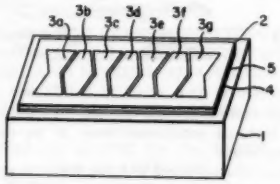
**4,516,838**

## OVERLAPPING ELECTRODE STRUCTURE FOR MULTI-CHANNEL ACOUSTO-OPTIC DEVICES

**Leon Bademian, Vienna, Va., assignor to Isomet Corporation, Springfield, Va.**

**Filed Sep. 26, 1983, Ser. No. 536,005**
**Int. Cl.³ G02F *1/11, 1/33***
**U.S. Cl. 350—358** **14 Claims**




1. Apparatus for acousto-optic interaction, comprising a body of acousto-optic material through which a beam of light is to be directed and means mounted on said body for generating columns of acoustic energy therein, said generating means including a plurality of electrodes arranged successively along a line transverse to the direction of the light beam, said plurality including adjacent electrodes positioned in such a manner that projections of portions thereof on said line overlap, whereby said light beam is converted into a plurality of overlapping diffracted light beams.

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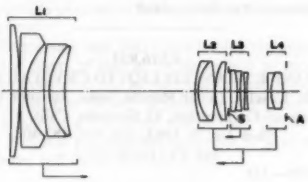
**4,516,839**

## ZOOM LENS SYSTEM

**Hisashi Tokumaru, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 29, 1985, Ser. No. 393,492**
**Claims priority, application Japan, Jun. 30, 1981, 56-102669**
**Int. Cl.³ G02B *9/64, 15/18***
**U.S. Cl. 350—426** **13 Claims**




1. A zoom lens system comprising:
a first lens unit of a negative refractive power;
a second lens unit of a positive refractive power located on the image side of the first lens unit with a first variable air space between the first and second lens unit;
a third lens unit of a negative refractive power located on the image side of the second lens unit with a second variable air space between the second and third lens units; and
a fourth lens unit of a positive refractive power located on the image side of the third lens unit with a third variable air space between the third lens unit and the fourth lens unit, wherein the first and third variable air spaces are reduced and the second variable air space is increased in accordance with an increase of the focal length of the whole lens system during zooming, wherein the lens system fulfills the following condition:

$$1 < \frac{|f_3|}{f_2} < 2$$

whereby:
$f_2$ represents the focal length of the second lens unit; and
$f_3$ represents the focal length of the third lens unit.

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**4,516,840**

## IN-FOCUS DETECTOR FOR A BINOCULAR STEREOMICROSCOPE

**Ken-ichi Nakahashi, and Shin-ichi Mihara, both of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan**

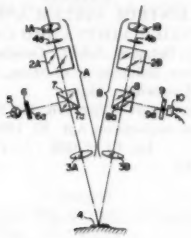
**Filed Jun. 25, 1982, Ser. No. 392,350**
**Claims priority, application Japan, Jul. 31, 1981, 56-119262**
**Int. Cl.³ G02B *21/00***
**U.S. Cl. 350—515** **16 Claims**

1. An in-focus detector for a binocular stereomicroscope, comprising:
a first observation optical system including an objective lens and an eyepiece;
a second observation optical system including an objective lens and an eyepiece;
a first beam splitter disposed intermediate said objective lens

and said eyepiece of said first observation optical system for projecting the optical image of a mark, which is used for detecting an in-focus condition, onto an object being observed through said optical systems;

a second beam splitter disposed intermediate said objective lens and said eyepiece of said second observation optical systems for passing the optical image of the mark reflected off the object and passing through said objective lens of said second observation optical system to a position outside of said second observation optical system;

projecting means, including a mark member, for projecting said optical image of said mark through said first beam splitter and said first objective lens onto said object, said mark member being so located that it is conjugate to said



object with respect to said first objective lens when said stereomicroscope is in focus;

a photoelectric transducer element located at said position outside said second observation optical system for receiving said optical image of said mark; and

a mask located between said transducer element and said second beam splitter, the relative location of said mask and said object with respect to said stereomicroscope being such that said mask is conjugate with said object whenever said stereomicroscope is in focus, the relationship of said mask and said mark being such that the amount of light received by said transducer element is at one of a minimum or maximum level when said stereomicroscope is in focus.

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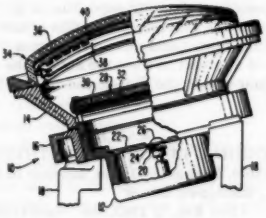
**4,516,841**

## METHOD FOR SCREENING LINE SCREEN SLIT MASK COLOR PICTURE TUBES

**Frank R. Ragland, Jr., Lancaster, Pa., assignor to RCA Corporation, Princeton, N.J.**

**Filed Aug. 19, 1983, Ser. No. 524,543**
**Int. Cl.³ G03B *41/00*; G03C *5/00***
**U.S. Cl. 354—1** **7 Claims**



1. In a method of screening a line screen slit mask color picture tube including coating a faceplate panel of said tube with a photosensitive material, said faceplate panel having a major axis and a minor axis, inserting a slit shadow mask into said panel and exposing said photosensitive material by passing light from a line light source through the slits of said mask, the improvement comprising:

positioning at least one generally cylindrical shaped lens between said line light source and said faceplate panel, during exposure said photosensitive material, with the longitudinal axis of said lens substantially perpendicular to the longitudinal axis of said line light source, whereby the images of said line light source projected through the slits of said mask onto said photosensitive material at locations off said major and minor axes are rotated toward parallelism with said minor axis thereby resulting in exposure of straight smooth lines on said photosensitive material.

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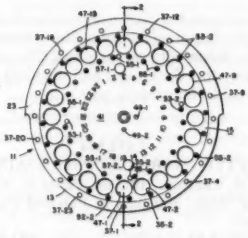
**4,516,842**

## APERTURE WHEEL

**John F. Trombert, 8 Old Summer St., Medway, Mass. 02054**

**Filed May 2, 1983, Ser. No. 490,436**
**Int. Cl.³ G03B *41/00***
**U.S. Cl. 354—4** **20 Claims**



1. An aperture wheel for use in selectively varying the characteristics of a beam of light, said aperture wheel comprising:

a. a circular frame adapted to be supported for rotation about its central axis, said frame having a plurality of circumaxially spaced openings,

b. a plurality of indexing pins mounted on said frame for use in indexing the angular position of said frame, each pin being associated with and precisely located with respect to one of said openings,

c. a circular disc seated on said frame member in axial alignment therewith said disc having a plurality of circumaxially spaced openings, said openings being positioned thereon so that they may be brought into registration with said circumaxially spaced openings on said frame.

d. means for fixing the angular position of said disc relative to said frame, and

e. means on said disc for use in mounting thereon a plurality of aperture plates, one over each of said circumaxially spaced openings.

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**4,516,843**

## CAMERA

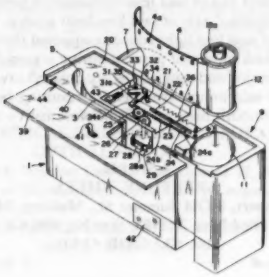
**Hiroshi Ohmura, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 31, 1984, Ser. No. 615,768**
**Claims priority, application Japan, Jun. 6, 1983, 58-99535**
**Int. Cl.³ G03B *1/18, 17/02***
**U.S. Cl. 354—173.1** **13 Claims**

1. A camera having a film supply chamber into which a film container with a drawn film leader is inserted axially, a film take-up chamber including a film take-up spool around which the film drawn out of the film container is wound and a film passage way connecting between the film supply and film take-up chambers into which the drawn leader is inserted upon inserting the film container into the film supply chamber; said camera comprising;

a camera body having either one of said chambers and a part of said film passage way;

a movable member having the other of said chambers and the remaining part of said film passage way, said movable member being mounted on said camera body so that said movable member is extensibly moved from a position



where incorporated with said camera body to a position where allowing insertion of a film container thereinto in order to substantially elongate said film passage way; and

a film loading door for closing and shielding said film supply chamber and film passage way.

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**4,516,844**

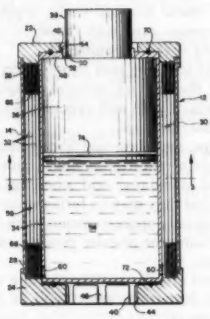
**FILM CASSETTE USABLE AS PROCESSING CHAMBER**

**Richard C. Kee, Chestnut Hill, and Philip R. Norris, No. Reading, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed May 2, 1984, Ser. No. 606,203**

**Int. Cl.³ G03B *17/26, 17/50;* G03D *13/02***

**U.S. Cl. 354—275** **5 Claims**



1. A photographic film assemblage for use with commercially available, compact, still picture cameras of the type having means for operably locating a film cassette containing a single roll of film in a position in which the film is adapted to be progressively withdrawn from the film cassette and exposed prior to being rewound into the film cassette, said film assemblage comprising:

a film cassette for housing a roll of self-developing type film, said film cassette including means defining a lighttight opening through which the film is adapted to be moved to the exterior of said film cassette for exposure thereof;

a length of self-developing type film coiled within said film cassette, said film including a first end which is adapted to be attached to a support member located within said film cassette and a second opposite end which is adapted to extend through said opening in said film cassette for subsequent attachment to a film take-up member of a camera;

a support member including a tube and a piston rotatably supported as a unit within said film cassette, said tube cooperating with an interior surface of said film cassette to define a chamber, said tube having at least one rupturable port leading from the interior of said tube to said chamber, said piston being mounted within said tube for movement between a first position in which a portion of said piston extends exteriorly of said tube and a second position in which said piston is located deeper within said tube; and

a supply of processing fluid located within said tube, said processing fluid being pressurizable, by said piston to a degree sufficient to rupture said at least one port to thereby permit the flow of said fluid into said chamber where it will initiate the formation of visible images in any photographically exposed film contained therein as said piston moves toward said second position.

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**4,516,845**

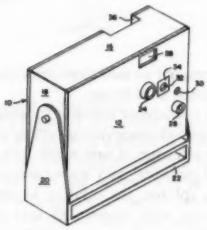
**SECURITY CONTROL SYSTEM AND METHOD FOR IDENTIFICATION CARD CAMERAS**

**Linda L. Blakely, Belmont; John C. Goodman, Marblehead, and David B. Walker, Belmont, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 538,375, Oct. 3, 1983, abandoned. This application Apr. 30, 1984, Ser. No. 605,618**

**Int. Cl.³ G03B *17/24***

**U.S. Cl. 354—412** **25 Claims**



1. A photographic identification camera of the type that produces a photoprint identification card having data and subject images in respective data and subject image areas thereof, and a record film image of the identification card, said identification card camera comprising:

means for supporting photosensitive film at first and second film planes, for supporting a data-carrying media, and for forming an image of a data-carrying media supported by said data-carrying media support means in a first area of the film at said first film plane and on the film at said second film plane and for forming an image of a subject in a second area of the film at said first film plane and on the film at said second film plane;

stored-program controlled processor means coupled to said first-mentioned means for effecting cyclic control of said first-mentioned means to expose an image of a data-carrying media to a first area of the film at said first film plane and to the film at said second film plane and to expose an image of a subject to a second area of the film at said first film plane and to the film at said second film plane.

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**4,516,846**

**RECORDING ERROR-PREVENTION SYSTEM**

**Hiromasa Hino, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Aug. 2, 1983, Ser. No. 519,669**

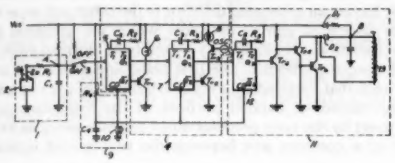
**Claims priority, application Japan, Aug. 10, 1982, 57-137855**

**Int. Cl.³ G03B *17/18***

**U.S. Cl. 354—465** **12 Claims**

1. A recording error-prevention system for a camera of the type that is set in a continous-recording mode of operation upon turning to ON a recording switch, comprising:

a position-sensing device for sensing an abnormal position of the camera relative to its horizontal position for ordinary recording; and



an alarm device for raising an alarm under the conditions that the recording switch is in the ON state and that the abnormal position of the camera is sensed by the position-sensing device.

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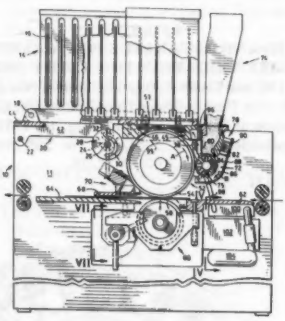
**4,516,847**

## ELECTROSTATIC PRINTING APPARATUS AND METHOD

**Andrzej Maczuszenko, Etobicoke; Ernest Davison, Brockville; Brian Otter; Brian F. Whittaker, both of Toronto; Christopher Novak, Whitby, and Dolf Landheer, Toronto, all of Canada, assignors to Delphax Systems, Mississauga, Canada**

**Filed Dec. 3, 1982, Ser. No. 446,759**
**Claims priority, application Canada, Dec. 4, 1981, 391561**
**Int. Cl.[3] G03G *15/16***
**U.S. Cl. 355—3 TR** **6 Claims**



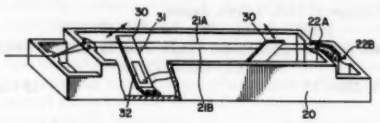
1. In an electrostatic printing apparatus including:
an electrostatically chargeable cylinder;
means for forming a toner image on said electrostatically chargeable cylinder; and
a pressure cylinder co-operating with said electrostatically chargeable cylinder;
the improvement comprising:
means for selectively displacing said pressure cylinder between a first position in which said pressure cylinder defines with said electrostatically chargeable cylinder a nip for receiving a sheet of copy material therebetween, and a second position, in which said pressure cylinder is spaced from said electrostatically chargeable cylinder; and
means for adjusting the axis of said pressure cylinder relative to said electrostatically chargeable cylinder and thereby adjusting the locations of said first and second positions.

**4,516,848**

## CHARGING DEVICE FOR AN ELECTROSTATIC COPYING MACHINE

**Shigeru Moriya, Nikaho, Japan, assignor to TDK Corporation, Tokyo, Japan**

**Filed Oct. 8, 1982, Ser. No. 433,434**
**Claims priority, application Japan, Mar. 5, 1982, 57-31198[U]**
**Int. Cl.[3] G03G *15/00***
**U.S. Cl. 355—3 CH** **8 Claims**




1. In a charging device for an electrostatic copying machine that includes a charging wire means positioned adjacent a surface to be electrostatically charged, the improvement comprising vibratory means for applying a vibration for a desired duration of time to said charging wire means, said vibratory means comprising tongue piece means positioned adjacent to said charging wire means and capable of being flexed into and out of contact with said charging wire means, said tongue piece means including piezoelectric element means which, when energized, causes said tongue piece means to be flexed, and signal means for applying a DC signal to said piezoelectric element means to flex said tongue piece means to a position in contact with or closely adjacent to said charging wire means, said signal means including means for superimposing a high frequency signal onto said DC signal so as to flex and vibrate said tongue piece means against said charging wire means.

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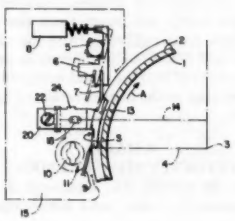
**4,516,849**

## CLEANING DEVICE FOR AN ELECTROSTATIC PHOTOGRAPHIC COPYING MACHINE

**Eiji Tsutsui, Amagasaki; Masahiro Yoshioka; Masahiro Murakami, both of Osaka, and Noriyuki Iwao, Kobe, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Mar. 17, 1983, Ser. No. 476,373**
**Claims priority, application Japan, Apr. 4, 1982, 57-56455**
**Int. Cl.[3] G03G *15/08***
**U.S. Cl. 355—15** **14 Claims**



1. A cleaning device for use in an electrostatic photographic copying machine of the type including a sensitive drum rotatable about an axis and provided at one axial end with an annular paper-stripping groove, for removing residual toner from the surface of the drum, said cleaning device comprising:
an upper blade mounted to contact the drum to strip therefrom residual toner;
a lower blade mounted below said upper blade and upstream thereof in the rotary direction of the drum for guiding the stripped residual toner to a toner withdrawal device; and
means for preventing the stripped toner from entering the paper-stripping groove, said means comprising a groove cover mounted to extend into and cover the paper-strip-

ping groove at least from the position of contact of said upper blade with the drum to the position of contact of said lower blade with the drum, said groove cover being in contact with said lower blade.

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**4,516,850**

## TONER CLEANING DEVICE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE

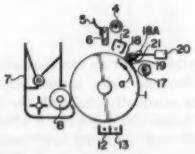
**Masaji Nishikawa, Hachioji, Japan, assignor to Olympus Optical Company, Ltd., Tokyo, Japan**

**Filed Apr. 21, 1983, Ser. No. 487,060**

**Claims priority, application Japan, Jun. 11, 1982, 57-99347**

**Int. Cl.³ G03G *15/08***

**U.S. Cl. 355—15** **13 Claims**



1. A toner cleaning unit for an electrophotographic copying machine including a charge retaining member on which an electrostatic latent image is formed and is converted into a toner image by means of a developing unit which utilizes a dry developer, the resulting toner image being transferred onto a record sheet, the cleaning unit being operative to remove any residual toner from the charge retaining member after the transfer of the toner image; comprising:

a movable cleaning blade disposed for selective contact with the charge retaining member to collect any toner which remains thereon after the transfer of the toner image,

means for selectively moving said cleaning blade towards and away from the charge retaining member,

and an intercept member disposed adjacent to the cleaning blade and upstream thereof as viewed in the direction of rotation of the charge retaining member and in contact with or in proximity to the latter, the intercept member being coextensive with the cleaning blade, a toner pile being formed in the region of contact between the blade and the charge retaining member as the blade is disposed in contact with the retaining member by said blade moving means, the intercept member intercepting any toner which might freely fall down from the pile when the cleaning blade is moved away from the charge retaining member by said blade moving means to permit the toner pile to be conveyed into the developing unit by the charge retaining member as the charge retaining member rotates.

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**4,516,851**

## VELOCITY MEASUREMENT

**John C. Parker, 56 Stirling Rd., Edinburgh 5, and James A. Blake, 11 Fingzies Pl., Leith Links, Edinburgh, both of Scotland**

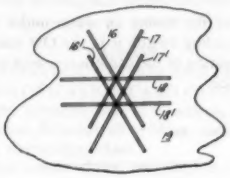
**Filed Mar. 26, 1982, Ser. No. 361,841**

**Claims priority, application United Kingdom, Mar. 26, 1981, 8109469**

**Int. Cl.³ G01P *3/36***

**U.S. Cl. 356—28** **20 Claims**

1. Apparatus for measuring the velocity of an object in relation to two orthogonal axes in a first plane containing a radiation source, the apparatus including two spaced optical units disposed in a second plane, the object being movable in one of the first or second planes and the source or the two optical units in said one plane being movable with the object, each unit including at least two crossed detectors, the centers of the detectors in each unit being coincident and each detector being arranged to receive radiation instantaneously exclusively from an associated elongated, linearly-extending portion of the first plane, the two detectors of a unit being arranged to receive radiation from different associated portions of the first plane which are angularly oriented relative to each other, each detector having an associated detector in the other unit so as to form an associated pair of detectors which are arranged to receive radiation simultaneously from two, corresponding, parallel, spaced portions of the first plane and which are arranged such that longitudinal axes of symmetry of each of said two, corresponding, parallel portions of the first plane are spaced apart by the same predetermined distance along an axis parallel to a common axis between the two spaced optical



units; separate comparing means for each pair of associated detectors for receiving signals representative of the detected intensities of radiation in a predetermined measurement period exclusively from their pair of associated detectors, each associated pair of detectors being arranged to receive during the measurement period radiation instantaneously from a plurality of two, corresponding, parallel portions of the first plane, and the comparing means determining from the signals received in the measurement period the delay between signals from the detectors of a pair corresponding to the same part of the same portion of the first plane; and means for computing the object's velocity in relation to said orthogonal axes from delays determined by the comparing means in the measurement period.

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**4,516,852**

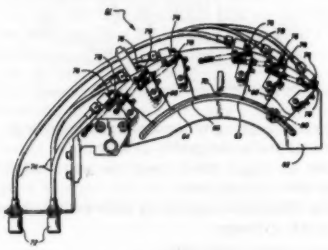
## METHOD AND APPARATUS FOR MEASURING INTENSITY VARIATION IN A LIGHT SOURCE

**Raymond C. Liu, and David A. Markle, both of Norwalk, Conn., assignors to The Perkin-Elmer Corp., Norwalk, Conn.**

**Continuation of Ser. No. 292,466, Aug. 13, 1981. This application Jan. 6, 1984, Ser. No. 568,764**

**Int. Cl.³ G03B *27/58***

**U.S. Cl. 356—121** **8 Claims**



1. In a method for eliminating the tilt of a trace resulting from plotting the detected energy from a lamp that is imaged along a tapered arcuate slit versus position along the slit, the steps comprising: detecting the light energy at positions along the length of the slit, obtaining a signal representative of the light energy along the length of the slit, providing a taper correction function based upon the position along the slit, and multiplying said intensity signal by said correction factor to produce a signal representative of the exposure uniformity

produced by the system and which ideally does not have a linear variation with slit position.

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**4,516,853**

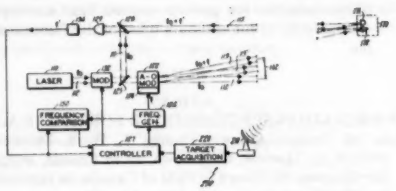
## LASER RADAR ADAPTIVE TRACKING SYSTEM

**James E. Pearson, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Mar. 31, 1982, Ser. No. 364,138**

**Int. Cl.³ G01B** *11/26;* **G01C** *1/00;* **G01J** *1/20*

**U.S. Cl. 356—152** **5 Claims**




1. An adaptive laser system for tracking a target comprising:

a laser for generating an output beam,

signal-generating means for generating a control signal containing a plurality of frequencies,

acousto-optical means responsive to a control signal containing a plurality of control frequencies having control signal frequency amplitudes for steering a portion of said output beam to form a steered beam directed at said target,

transducer means adjacent to a first side of said acousto-optical means, for coupling simultaneously at least two frequencies of said plurality of frequencies into said first side of said acousto-optical means, so that said steered beam comprises simultaneously at least two steered sub-beams, each of which steered sub-beams is steered in a direction depending on one of said at least two frequencies,

detector means for receiving radiation reflected from said target, and

control means for controlling said acousto-optical means by increasing selected ones of said control signal amplitudes of said control signal frequencies, whereby said steered beam is increased in power.

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**4,516,854**

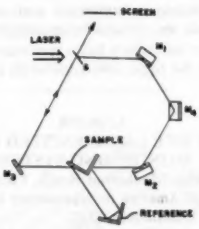
## INTERFEROMETRIC ANGULAR MEASUREMENT SYSTEM

**Jacques F. Ludman, 98 Old Lowell Rd., Westford, Mass. 01886**

**Filed Dec. 3, 1981, Ser. No. 326,857**

**Int. Cl.³ G01B** *11/26*

**U.S. Cl. 356—363** **3 Claims**




1. An interferometric angular measurement system for measuring the angle between a first subject mirror and a second subject mirror comprising:

a source of coherent radiation directed along an initial path;

an observation screen for the radiation;

means in said path for splitting said radiation into two substantially equal intensity beams, a first beam and a second beam;

first optical means including first, second, and third mutually perpendicular reflecting surfaces for directing the first beam to said first subject mirror;

second optical means for directing the second beam to said second subject mirror;

third optical means including two reflecting surfaces and a tilt adjustment mechanism with an angle between the two reflecting surfaces which is approximately equal to the angle between said first and second subject mirrors for directing the first beam after it has been reflected off the first subject mirror to the second subject mirror, and for directing the second beam after it has reflected off the second subject mirror to the first subject mirror;

wherein said tilt adjustment serves to eliminate any vertical angular deviation of said first and second beams,

wherein said second angled subject mirror serves to direct the first beam to the second optical means,

wherein said first angled subject mirror serves to direct the second beam to the first optical means,

wherein the first optical means serves to direct the second beam back to the beam splitting means,

wherein the second optical means serves to direct the first beam back to the beam splitting means,

and wherein at said beam splitting means a substantial portion of said first and second beams are superimposed and directed to said observation screen,

whereby light patterns appearing on said observation screen are successively indicative of the angular difference between the subject mirrors versus the reflective surfaces of the third optical means.

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**4,516,855**

## METHOD AND APPARATUS FOR DETERMINING THE POLARIZATION STATE OF A LIGHT WAVE FIELD

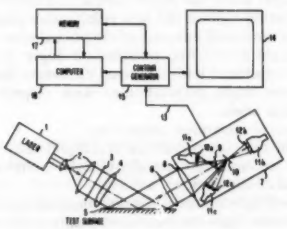
**Hans E. Korth, Stuttgart, Fed. Rep. of Germany, assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 18, 1982, Ser. No. 359,406**

**Claims priority, application European Pat. Off., Apr. 4, 1981, 81102533.5**

**Int. Cl.³ G01J** *4/04*

**U.S. Cl. 356—367** **7 Claims**




1. A method for interferometrically determining the topography of a surface by investigating the polarization state of a light wave field reflected from said surface comprising the steps of:

illuminating the surface to be investigated with a first circularly polarized light beam to obtain a beam reflected from said surface to be investigated;

deriving a plane polarized beam from said first circularly polarized beam;

illuminating a reference surface with said plane polarized beam to obtain a corresponding plane polarized beam reflected from said reference surface;

converting said beam reflected from the reference surface into a second circularly polarized beam, the direction of

polarization of said second circularly polarized beam being opposite to the direction of polarization of said first beam;

superimposing said two circularly polarized light beams to form a combined light wave field containing, by way of its resultant polarization state, data characterizing the surface topography of the surface to be investigated;

directing said combined light wave field onto polarization camera means; and

measuring for each point of the combined light wave field the intensity transmitted by said polarization camera means for three different transmission directions, each differing from the other by 60°.

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**4,516,856**

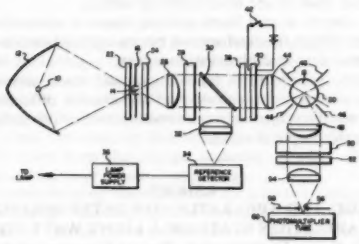
## OPTICAL APPARATUS FOR FLUORESCENCE POLARIZATION INSTRUMENT

**Susan R. Popelka, Gurnee, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Continuation of Ser. No. 223,633, Jan. 9, 1981, abandoned. This application Aug. 5, 1982, Ser. No. 405,459**

**Int. Cl.³ G01N *21/64*; G01J *4/04***

**U.S. Cl. 356—368** **5 Claims**



1. Optical apparatus for a fluorescence polarization analyzer wherein a fluorescent liquid sample is irradiated with excitation light and radiates an emission light from which the polarization, P, is determined in accordance with the expression: $I(Z)-I(Y)/I(Z)+I(Y)$, where I(Z) is the measured intensity of one polarization component of the emitted light at a first polarization angle when the liquid sample is irradiated with polarized excitation light at the first polarization angle, and where I(Y) is the measured intensity of the polarization component of emitted light at the first polarization angle when the liquid sample is irradiated with polarized excitation light at a second polarization angle perpendicular with respect to said first polarization angle,

said optical apparatus comprising:

a sample tube for containing said liquid sample, said sample tube having a substantially circular peripheral cross-sectional configuration;

a focused light source for irradiating said liquid sample with excitation light focused substantially at the center of said sample;

said focussed light source comprising a relatively low wattage, low intensity tungsten halogen lamp;

a narrow bandwith filter intermediate said focused light source and said sample for passing excitation light corresponding substantially to the absorption band of the fluorescent sample;

a first polarizer intermediate said narrow bandwidth filter and said sample, said polarizer having a fixed plane of polarization at said first polarization angle;

a field effect liquid crystal intermediate said polarizer and said sample, including means for alternately applying an electric field to said liquid crystal to alternately apply excitation light polarized at the first or second polarization angles to said liquid sample;

a photomultiplier detector including an input aperture restricting the emission light viewed by said photomultiplier;

baffle means adjacent the sample tube substantially preventing reflections of excitation light from entering the path of said emission light to said photomultiplier input aperture;

emission light focusing lenses intermediate said sample and said photomultiplier for focusing emitted light to said photomultiplier input aperture;

a second polarizer intermediate said sample and said photomultiplier having a fixed plane of polarization at said first polarization angle; and

a wide bandwidth filter intermediate said sample and said photomultiplier for passing emitted light corresponding substantially to the emission band of the fluorescent sample.

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**4,516,857**

## CORRELATION SPECTROMETER FOR NERVE AGENTS

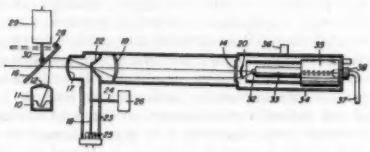
**John M. Preston, Ottawa; Thomas V. Ward, Thornhill, and William H. Morrow, Cookstown, all of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Canada**

**Filed May 4, 1982, Ser. No. 374,701**

**Claims priority, application Canada, May 4, 1981, 376763**

**Int. Cl.³ G01N *21/61***

**U.S. Cl. 356—418** **16 Claims**



1. A correlation spectrometer for the detection of a toxic substance in the atmosphere comprising:

light responsive means for providing electrical signals;

means for directing ambient light onto said light responsive means;

said light directing means comprising means for passing a first portion of the light onto said light responsive means through a solid reference substance in the form of a foil and for passing a second portion of the light onto said light responsive means without passage through the reference substance, whereby said light responsive means provides first and second electrical signals corresponding respectively, to said first and second light portions; and

signal processing means for comparing said first and second electrical signals;

wherein said reference substance is a surrogate substance different from the toxic substance to be detected by the spectrometer but which has a spectrum which correlates with that of the toxic substance to be detected.

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**4,516,858**

## MULTIPLE SITE LASER EXCITED POLLUTION MONITORING SYSTEM

**Jerry A. Gelbwachs, Manhattan Beach, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Feb. 9, 1982, Ser. No. 347,391**

**Int. Cl.³ G01N *21/01***

**U.S. Cl. 356—437** **6 Claims**

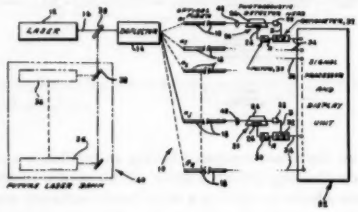
1. A multiple site laser excited pollution monitoring system, comprising:

a laser situated at one preselected location, said laser producing an output beam of electromagnetic radiation at a predetermined wavelength;

a beam deflector optically aligned with said laser beam for deflecting said laser beam in a predetermined timed sequence to a plurality of distinct different positions;

means for receiving each of said deflected laser beams at each of said distinct different positions and for transmitting each of said deflected laser beams at said predetermined sequence of time to a plurality of other preselected locations remote from each other and from said one preselected location;

a plurality of laser excited photoacoustic pollution detectors, each of said laser excited pollution detectors being located at a different one of said other preselected locations and each of said detectors receiving each of said deflected laser beams, respectively, at a different time in accordance with said predetermined timed sequence;



each of said laser excited pollution detectors providing an electrical output signal representative of the presence of pollutants at said plurality of other locations, respectively;

a separate electrical wire connected to each of said laser excited pollution detectors for transmitting each of said electrical output signals to said one preselected location; and

means located at said one preselected location for connecting thereto each of said separate electrical wires and for receiving each of said electrical output signals from said pollution detectors, analyzing said signals, and providing an output indicating the presence and quantity of pollutants present at each of said plurality of other preselected locations.

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**4,516,859**

## APPARATUS FOR CLOSING A DISCHARGE OPENING IN A ROTARY TABLE

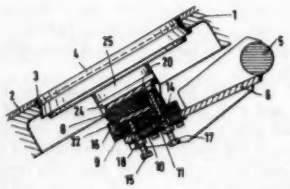
**Adolf Spengler, Külsheim, and Josef Hasenhündl, Ahorn, both of Fed. Rep. of Germany, assignors to Hubert, Eirich Eirich, Hardheim, Fed. Rep. of Germany**

**Continuation of Ser. No. 110,970, Jan. 10, 1980, abandoned. This application Jan. 21, 1982, Ser. No. 341,426**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1979, 2903951**

**Int. Cl.³ B28C** *7/16*

**U.S. Cl. 366—77** **6 Claims**



1. A rotary closure apparatus for closing a discharge opening in a container, comprising:

a shaft supported on said container for rotation abouts its longitudinal axis;

a support arm rigidly connected to said shaft for rotation therewith;

a closure cover carried by said support arm for closing or opening said discharge opening upon rotation of said shaft;

pivot bearing means for rigidly interconnecting said closure cover to said support arm for relative pivotal movement therebetween about a single axis disposed transverse to said discharge opening; and

resilient means engaging said support arm and said closure cover for yieldably supporting said closure cover in a desired position relative to said support arm so that said closure cover can pivot about said single axis upon application of a force thereto but will return to said desired position upon removal of said force.

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**4,516,860**

## MIXER FOR DRILL CUTTINGS AND DRILLING MUD ON A DRILLING LOCATION

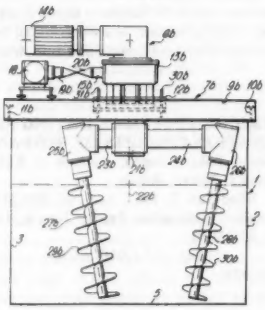
**Jan G. J. van der Laan, Warnsveld, and Willem Entrop, Gemeente Noordwijkerhout, both of Netherlands, assignors to Hosokawa-Nauta B.V., Netherlands**

**Filed May 4, 1983, Ser. No. 491,453**

**Claims priority, application Netherlands, Jun. 5, 1982, 8201868**

**Int. Cl.³ B01F** *7/08*

**U.S. Cl. 366—287** **8 Claims**



1. A device for keeping drill cuttings in suspension in a viscous drilling mud comprising:

a mixing vessel (**1**) for containing the mud and cuttings;

a plurality of agitating devices (**6**) mounted on the vessel to project into the vessel, each of said agitating devices comprising:

a pair of generally horizontal support arms (**23**, **24**) connected to a head (**21**), one of said support arms (**24**) being longer than the other of said support arms (**23**);

first drive means (**13**, **14**) coupled to said head for rotating said arms about a generally vertical axis (**22**);

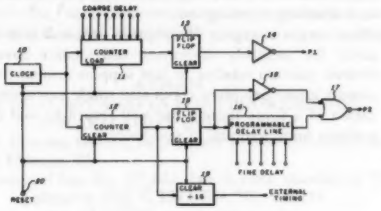
an elongated mixing screw (**17**, **18**) mounted on the end of each of said arms and extending downwardly into said vessel, said mixing screws being of equal length, the mixing screw (**27**) mounted on the end of said shorter support arm (**23**) having a larger outside diameter than the mixing screw (**28**) mounted on said longer support arm (**24**); and

second drive means (**15**) coupled to said mixing screws for rotating each of said screws about its own longitudinal axis.

## 4,516,861
## HIGH RESOLUTION AND HIGH ACCURACY TIME INTERVAL GENERATOR

John W. Frew, Chelmsford, and Kenneth W. Robbins, North Reading, both of Mass., assignors to Sperry Corporation, New York, N.Y.

Filed Oct. 7, 1983, Ser. No. 540,081
Int. Cl.[3] G04F 8/00
U.S. Cl. 368—120 10 Claims




1. Time interval generation apparatus, comprising:

a source of clock pulses,

first and second counter means coupled to receive said clock pulses,

one of said first and second counter means being presettable to a coarse delay value by a coarse delay signal,

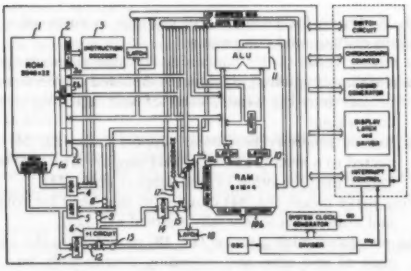
said first and second counter means providing respective first and second transition signals in response to said clock pulses and separated in time in accordance with said coarse delay signal, and

programmable delay means responsive to said second transition signal and to a fine delay signal for delaying said second transition signal in accordance with said fine delay signal, so that said first transition signal is separated in time from said delayed second transition signal by a time interval determined by said coarse and fine delay signals.

## 4,516,862
## ELECTRONIC TIMEPIECE HAVING ADDRESS DESIGNATION CIRCUITS OF ROM AND RAM

Yosuke Yoshida, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Tokyo, Japan

Filed Jun. 2, 1983, Ser. No. 500,252
Claims priority, application Japan, Jun. 4, 1982, 57-95887; Jun. 4, 1982, 57-95888
Int. Cl.[3] G04C 15/00
U.S. Cl. 368—155 4 Claims

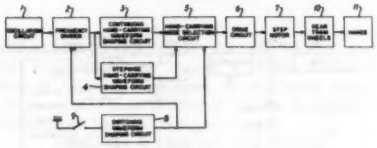



1. In an electronic timepiece having a ROM and a RAM: an address designation circuit for the ROM comprising an address register for storing the content of an emit-field through first gate means, a ROM address decoder for receiving the output of said address register and designating the address of the ROM, a +1 circuit for computing the content of said address register plus 1, and second gate means for controlling the connection between said +1 circuit and said address register.

## 4,516,863
## ELECTRONIC TIMEPIECE OPERABLE IN CONTINUOUS AND STEPWISE MODES

Yukio Ikehata, Tokyo, Japan, assignor to Seiko Instruments & Electronics Ltd., Tokyo, Japan

Filed Oct. 6, 1983, Ser. No. 539,713
Claims priority, application Japan, Oct. 7, 1982, 57-176577
Int. Cl.[3] G06F 1/04; G04F 5/00
U.S. Cl. 368—157 4 Claims



1. In an electronic timepiece having an oscillation circuit, a frequency-dividing circuit, a drive circuit, a step motor, and gear train wheels for driving a set of hands including a second hand, the improvement wherein: the drive circuit has means for producing an output of n pulses (where n is an integer of 2 or greater) per second; a first circuit for producing n pulses serving as continuous hand-carrying pulses having a period of 1/n second; a second circuit for producing n pulses serving as stepwise hand-carrying pulses that occur in a concentrated manner in a particular section of a second; a mode selection circuit operative to select said continuous hand-carrying pulses and said stepwise hand-carrying pulses upon operation of an external switch; and wherein when the number of poles of said step motor is k, the reduction ratio of the gear train wheels from the rotor of the step motor to the wheel on which the second hand is mounted, is 1 to 60n/k.

## 4,516,864
## NON-CONTACT SENSING APPARATUS AND METHOD FOR POLYMER MELT TEMPERATURE PROFILE DETERMINATION

Wontaik Kim, Clifton Park, and Farzin H. Azad, Troy, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1982, Ser. No. 453,667
Int. Cl.[3] G01J 5/00
U.S. Cl. 374—130 9 Claims

1. An apparatus for temperature profile determination in flowing polymer melts comprising:

a conduit section for flow-through transport of said melt;

at least two optical windows disposed in said conduit section, said windows being disposed on opposite sides thereof;

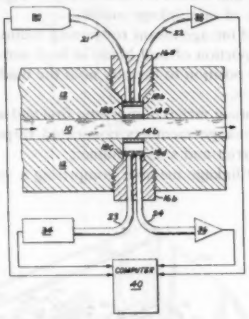
means for irradiating said polymer melt, through a first of said windows, with electromagnetic radiation of a select wavelength, so that said radiation is transmitted through said melt;

means for detecting the level of radiation transmitted through said melt and through the second of said windows, said detecting means generating electrical signals responsive to the intensity of said transmitted radiation;

means for providing temperature data with respect to the surface temperature of said melt, within said conduit, in the vicinity of at least one wall of said conduit windows; and

computing means receiving electrical signals from said trans-

mission detection means and operating thereon, along with said surface temperature data, so as to provide an



indication of the temperature profile of said melt between said windows.

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**4,516,865**

## RESISTANCE THERMOMETER

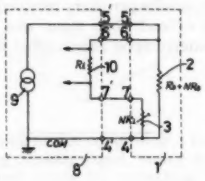
**Sugimori Hideo, 12-2, Koaza Shimokubota, Ohaza Hohsono, Seikacho, Sohrakugun, Kyoto-fu, Japan**

**Filed May 31, 1983, Ser. No. 499,427**

**Claims priority, application Japan, May 31, 1982, 57-093306**

**Int. Cl.³ G01K** *7/20, 7/22*

**U.S. Cl. 374—172** **1 Claim**



1. A resistance thermometer comprising:

a temperature sensing circuit unit consisting of a temperature sensing resistor to be subject to a temperature to be measured and a compensating resistor, said temperature sensing resistor and said compensating resistor each having first and second terminals, wherein said first terminals of said temperature sensing resistor and said compensating resistor are connected together so as to comprise a common terminal, and said second terminal of said temperature sensing resistor comprised a current input terminal, and said second terminal of said compensating resistor comprises a signal output terminal;

a current source connected between said current input terminal and said common terminal;

a signal output resistor connected between said current input terminal and said signal output terminal;

wherein the ratio of resistance of said signal output resistor compared with resistance of said compensating resistor is equal to the ratio of desired resistance of said temperature sensing resistor compared with a positive resistance error of said temperature sensing resistor.



**4,516,866**

## PRINTING APPARATUS

**Masahide Yamauchi, Kawasaki, and Kunio Fukatsu, Ebina, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

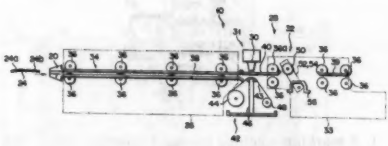
**Filed Jul. 26, 1982, Ser. No. 401,711**

**Claims priority, application Japan, Jul. 31, 1981, 56-120143**

**The portion of the term of this patent subsequent to Dec. 18, 2001, has been disclaimed.**

**Int. Cl.³ B41J** *3/28*

**U.S. Cl. 400—25** **18 Claims**



6. An apparatus for printing a page of a book which is opened to expose a pair of pages lying within a plane of conveyance of the book, said apparatus comprising:

printing means for printing onto one page of said exposed pair of pages of the book;

page turning means adjacent to and separated from said printing means to define a path of book conveyance, said page turning means for turning said one page of said exposed pair of pages; and

guide means for guiding the book along said book conveyance path defined between said print means and said page turning means, said guide means movable between a print position wherein said guide means is disposed inside of said page turning means to expose a page of the book to said printing means to thereby permit said print means to print upon the page exposed thereto and, a page turning position wherein said guide means is disposed inside of said printing means to expose a page of the book to said page turning means to thereby permit said page turning means to turn the page exposed thereto; and

first driving means operatively coupled to said guide means for moving said guide means between said print and page turning positions; wherein said page turning means includes

(a) a roller selectively rotatable in first and second opposite directions;

(b) first transfer means for selectively transferring said roller along said conveyance path between a first position above said one page and a second position above the other page of said pair of exposed pages, wherein said one and other pages are picked up and caused to run onto said roller when said roller is in said first and second positions, respectively;

(c) pressing means for pressing said one and other pages against said roller when said roller is in said first and second positions, respectively;

(d) second driving means for rotating said roller in said first direction when said roller is in said first position so that said one page is picked up and caused to run onto said roller, and for rotating said roller in said second direction, opposite to said first direction, when said roller is in said second position so that said other page is picked up and caused to run onto said roller; and

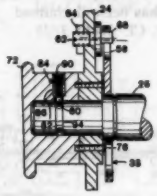
(e) second transfer means for transferring said book in a conveyance directly within said conveyance path when said one page is located on said roller in said first position so that said roller is shifted from said first position toward said second position thereby turning said one page, and for transferring said book when said other page is located on said roller in said second position so that said roller is shifted from said second position toward said first position thereby turning said other page.

**4,516,867**

## PRINTING WHEEL CONNECTING AND ADJUSTING MEANS

**Roy A. Schacht, 744 Des Peres Rd., St. Louis, Mo. 63131**

**Filed Sep. 22, 1982, Ser. No. 421,300**
**Int. Cl.[3] B41J *1/54***
**U.S. Cl. 400—175** **4 Claims**



1. A marking machine having a printing wheel with printing characters supported on a periphery of the wheel, means for supporting the wheel upon a drive shaft, means for rotating the drive shaft and wheel to a selected position to move a character on the wheel in a printing position over a work piece, the improvement comprising means for rotatably adjusting the wheel independently of the shaft, said means comprising a support means on said shaft and eccentric means supported upon the wheel and engageable with said support means, said eccentric means being moveable to adjust said wheel in a rotated position with respect to said shaft to adjust the printing position of said characters with respect to said workpiece, said support means comprising a backing member fixed to said drive shaft, said wheel being slidably mounted on said drive shaft and said eccentric means connecting said wheel and said backing member to provide a drive train from said drive shaft to said wheel, said eccentric means comprising a wheel adjustment shaft element rotatably journalled in said wheel and an eccentric shaft rotatably journalled in said backing member and means for rotating said wheel adjustment shaft element to provide for relative movement between said backing member and said drive shaft with respect to said wheel to rotatably adjust the wheel with respect to said drive shaft, said eccentric shaft being connected to a plate-like member which plate-like member is in abutting relation against an interior surface of said wheel and said eccentric shaft extending from said plate-like member to said backing member and a tightening element receivable on an exterior end of said wheel adjustment shaft element in clamping relation against said eccentric means and said wheel.

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**4,516,868**

## MASTIC APPLICATOR AND ADJUSTABLE BLADE ASSEMBLY

**Rick K. Molnar, Long Beach, Calif., assignor to Hawk Industries, Inc., Signal Hill, Calif.**

**Filed May 28, 1982, Ser. No. 383,094**
**Int. Cl.[3] B28B *3/00*; B29C *3/04***
**U.S. Cl. 401—5** **6 Claims**

1. Apparatus for applying and dispensing mastic comprising

a container for confining a quantity of mastic, said container including an opening for dispensing mastic from the container, and means for causing mastic to flow from said container through said opening, and

an adjustable curvature blade assembly for distributing and contouring mastic dispensed from the container, said assembly comprising

a blade carrier connected at end portions thereof to said container,

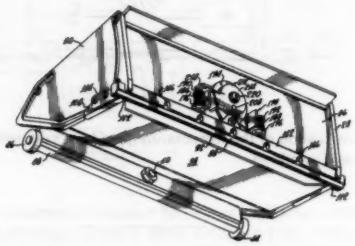
a flexible blade secured to said carrier, and

adjustment means interconnected between said container and an intermediate portion of said carrier for shifting the intermediate portion of the carrier relative to said end portions thereof to control curvature of the blade, said adjustment means comprising rigid linkage means connected to said container and connected to said carrier for effecting a positive bidirectional adjustment of said blade to increase or decrease curvature of the blade, and means for selectively changing the effective length of said linkage means,

said rigid linkage means restraining motion of an intermediate portion of said blade in both directions from adjusted position to thereby hold the blade in its adjusted position,

said adjustment means comprising first and second interconnected linkage members connected respectively to said blade carrier and said container,

said first linkage member comprising a yoke plate pivotally connected to said blade carrier, and said second linkage member comprising a cam interengaged with said yoke plate and having a pivotal connection to said container on a pivot axis substantially fixed to said container, and including means for adjustably pivoting said cam to thereby cause said cam to positively drive said yoke plate and blade in either of two opposite directions,



said yoke plate comprising a plate having a circular aperture and said cam comprising a disc mounted to said container for pivotal motion about a pivot axis, said disc having a circular periphery received within the circular aperture of said yoke plate, said circular periphery being centered upon an axis offset from said pivot axis.

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**4,516,869**

## CLIP FOR WRITING PEN OR SIMILAR OBJECT

**Marcel Corpataux, Fribourg, Switzerland, assignor to USI-FLAMME S.A., Villars-sur-Glane, Switzerland**

**Filed Oct. 21, 1980, Ser. No. 199,272**
**Claims priority, application France, Oct. 26, 1979, 79 26650**
**Int. Cl.[3] B43K *25/00***
**U.S. Cl. 401—131** **5 Claims**

1. A writing pen or similar article comprising

a body

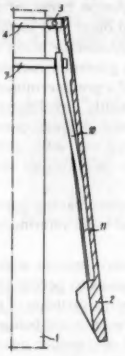
a rigid fastening clip extending along the outside of the body, said clip having a mounting end and a free end,

means rigid with and outside said body for pivotally connecting said mounting end of said clip to said body for pivotal movement about an axis,

a leaf spring for urging said clip toward said body, said spring having a first end secured to said fastening clip near the free end of the clip, and a second end spaced from the first end, and

means rigid with and outside said body and having an opening near said axis and between said axis and the free end of

said clip, for receiving said second end of said leaf spring to connect said second end to said body, said opening being slightly greater than the second end of said leaf spring.



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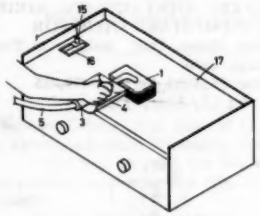
**4,516,870**

## GRIDDLE CLEANING DEVICE

**Teiji Nakazato, 9-12, Higashi Azabu 1-chome, Minato-ku, Tokyo, Japan**

**Filed Sep. 19, 1983, Ser. No. 533,446**
**Int. Cl.³ A46B *11/06***
**U.S. Cl. 401—146** **7 Claims**



1. A griddle cleaning device comprising: a brush, means for selectively supplying cleaning liquid, rinsing liquid and water to said brush, control means for controlling said supplying means to selectively and timely supply the cleaning liquid, rinsing liquid and water in a predetermined sequence, a concentration sensor means attachable to the upper surface of a griddle and connected to said control means to continuously send information indicative of concentration of the cleaning liquid on the upper surface of the griddle during water washing to the control means, said control means being operatable on the basis of the concentration information.

2. A griddle cleaning device comprising a brush having a base with an outlet opening, a multitude of bristles secured to said base, a hollow handle connected with said base and having one end in communication with said outlet opening in said base and the other end coupled with a hose, and means for selectively feeding one of a cleaning liquid, water and a rinsing liquid to said hose and, wherein said means for selectively feeding one of a cleaning liquid, water and a rinsing liquid to said hose comprises a control unit including a pump connected to said hose, a first tank for storing said cleaning liquid, a second tank for storing said rinsing liquid, said first and second tanks being connected to said pump through respective valve means, a water conduit leading from a water source to said pump and having a valve means inserted therein, a by-pass conduit leading from said water source to said hose while by-passing said water conduit and said pump, said by-pass conduit having a valve means inserted therein, and a power source and control section for controlling operations of said pump and all of said valve means.

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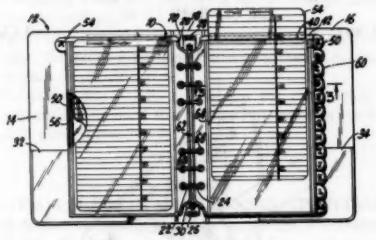
**4,516,871**

## TABULATED SHEET PROTECTORS

**Ervin Leitman, 1682 53rd St., Brooklyn, N.Y. 11204**

**Filed Jul. 29, 1982, Ser. No. 403,128**
**Int. Cl.³ B42F *13/00, 21/00, 21/02;* B42D *17/00***
**U.S. Cl. 402—79** **11 Claims**



1. A sheet protector, comprising:
upper and lower layers of substantially transparent plastic material;
a pair of complementary tabs, each tab laterally extending from the edge of a respective layer and integrally formed therewith, each tab comprising an identification means thereon;
a heat sealed indent securing together at least a portion of the peripheries of said layers;
a separate heat sealed indent which forms said indentification means on said tabs, and
opening means defining a pocket in combination with said layers, whereby a sheet may be inserted in said pocket.

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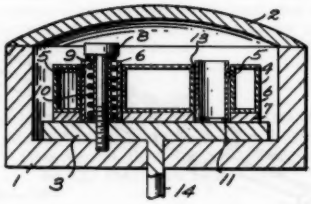
**4,516,872**

## APPARATUS FOR FASTENING ELECTRIC STRUCTURAL PARTS INTO THE CONNECTING HEAD OF ELECTRICAL THERMOMETERS

**Kurt Eiermann, Pfungstadt, and Thomas Kayser, Dietzenbach, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Nov. 29, 1983, Ser. No. 556,116**
**Claims priority, application Fed. Rep. of Germany, Dec. 3, 1982, 3244718[U]**
**Int. Cl.³ F16B *1/04***
**U.S. Cl. 403—24** **3 Claims**



1. A connection device for fastening an electrical member in a connection means for an electrical thermometer having a plate member, said connection means including a housing and fastening means comprising a bolt, a casing and a spring means, said electrical member having a bore, said casing being inserted in said bore, said spring means being disposed at least partly in

said casing with said bolt having a head engaging said spring means and said spring means having a portion engaging said casing so that when said bolt is attached to said housing said spring means will urge said casing toward said plate member of said thermometer.

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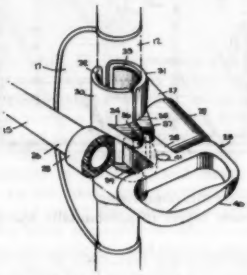
**4,516,873**

## SAILBOARD BOOM-TO-MAST CONNECTOR

**David R. Humble, 2696 Emerald Way, Deerfield Beach, Fla. 33441, and Hans Barth, 1720 NE. 17th Ave., Ft. Lauderdale, Fla. 33305**

**Filed Apr. 6, 1983, Ser. No. 482,470**
**Int. Cl.³ B63B** *15/00*
**U.S. Cl. 403—191** **4 Claims**



**1**. A connector for establishing a boom-to-mast connection between the boom and the mast of a sailboard comprising in combination a pair of complemental semi cylindrical jaws each joined to a body member for separate movement selectively between mast clasping and releasing positions, and at least one socket for receiving an end of said boom therein, said socket being pivotally and operatively joined to said body member for independent rotation about its pivot relative to said jaws in one direction or the other, rotation of said at least one socket about its pivot in said one direction being operative to urge at least one of said jaws into clasping embrace of said mast while rotation in said other direct enables said jaws to release said mast.

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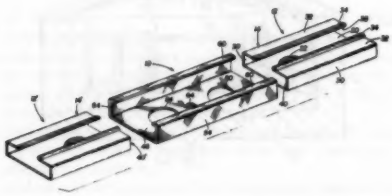
**4,516,874**

## CHANNEL CONNECTOR

**James H. C. Yang, Cleveland, and Walter Tomaszewski, Canton, both of Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio**

**Filed Apr. 23, 1984, Ser. No. 602,871**
**Int. Cl.³ F16B** *2/02*
**U.S. Cl. 403—313** **12 Claims**



**1**. The combination of a channel connector for physically connecting and spacing the adjacent end portions of a pair of first and second axially aligned substantially similar channel members, each of said channel member being of generally rectangular form, in transverse cross section, having a substantially flat bottom wall, similarly projecting side walls, and top walls parallel to said bottom wall, said top walls having contoured inner edges separated by a continuous central longitudinal slot, each of said channel members further including an outwardly directed protrusion centered a first distance from the channel member axial outer end surface and having a first dimension, said channel connector being comprised of a flexible resilient material of a generally rectangular form, in transverse cross section, and of a predetermined axial extent having:

(a) bottom and side walls enveloping the corresponding adjacent walls of said channel members, said channel connector also having top walls enveloping at least the transverse outermost portions of the top walls of said channel members;

(b) transverse spacer means, having opposed first and second sides, on said bottom wall, intermediate the ends of said channel connector;

(c) said channel connector bottom wall having a first aperture of a dimension so as to permit the physical retention of the channel member protrusion of the first of said channel members, said first aperture being centered a distance, from the first side of said spacer means, greater than said first distance of said first channel member; and

(d) said channel connector bottom wall having a second aperture of a dimension greater than the first dimension of the protrusion of the second of said channel members, said second aperture being centered a distance from the second side of said spacer means less than the first distance of said second channel member, said second aperture cooperating with the protrusion of said second channel member so as to physically bias said second channel member axial outer end surface against the second side of said spacer means.

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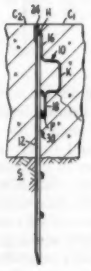
**4,516,875**

## CONCRETE SLAB KEY JOINT FORMING STRIP AND SUPPORTING STAKE THEREFOR

**Frank E. Turner, San Mateo, Calif., assignor to The Burke Company, San Mateo, Calif.**

**Filed Mar. 28, 1983, Ser. No. 479,355**
**Int. Cl.³ E01C** *11/04*
**U.S. Cl. 404—50** **19 Claims**

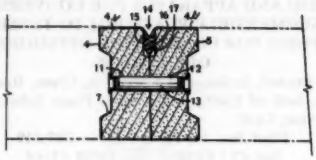


**11**. An improved stake for supporting a strip used to form a key joint between adjacent concrete slabs, said stake comprising: an elongated body member having an upwardly facing ledge at one end thereof proportioned for receipt within a hook segment on an upper end of a strip to suspend the strip from the ledge; and, an outwardly extending hook formed in the body member intermediate the length thereof to engage a lower portion of the strip suspended from the stake, said hook having a downwardly facing distal end engagement with the lower portion of a strip suspending from the body to maintain the strip in tension between said end and the ledge and said hook having an angled portion extending downwardly and inwardly to said distal end providing an outer cam surface to facilitate such engagement.

## 4,516,876
## PRECAST CONCRETE EXPANSION JOINT FOR ROADS AND THE LIKE

Harry O. Wicks, 5563 Meadow Dr., Hamburg, N.Y. 14075

Filed Jan. 10, 1983, Ser. No. 456,554
Int. Cl.³ E01C 11/14
U.S. Cl. 404—60 10 Claims



1. For use in a poured concrete roadway of the type requiring at least one expansion joint at a predetermined location along the length of the roadway, and having forms at opposite sides of the roadway defining the depth of the concrete to be poured, a precast concrete beam to be installed in said forms at said location requiring an expansion joint, said beam having its length and depth corresponding to the width and depth of the concrete to be poured and having its upper surface flush with the concrete to be poured, said beam remaining in place in the poured concrete as a permanent part of the road, and said beam having opposite sides consisting of separate precast units of concrete movable toward and away from each other and cooperating to form an expansion joint groove in said upper surface extending between said forms.

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## 4,516,877
**Patent Not Issued For This Number**

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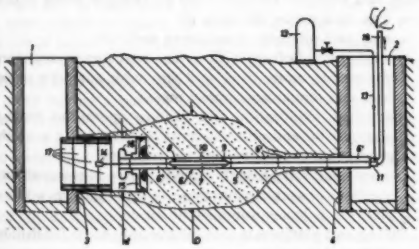
## 4,516,878
## TUNNEL CONSTRUCTING

Dieter Rebhan, Gelting, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Sep. 28, 1982, Ser. No. 425,200
Claims priority, application Fed. Rep. of Germany, Oct. 13, 1981, 3140672
Int. Cl.³ E02D 19/14; E21D 1/06, 9/00
U.S. Cl. 405—130 3 Claims



1. A method of constructing a horizontal tunnel between two vertical shafts comprising the steps of

(1) driving a drill pipe between the two vertical shafts thereby interconnecting the two vertical shafts and leaving the drill pipe in place after drilling, the drill pipe comprising a plurality of axially aligned segments being screw-threaded to each other,

(2) slidably inserting an internal pipe into the drill pipe, the internal pipe having an enlarged diameter portion near an end thereof, the enlarged portion being provided with annular rubber seals at its opposite ends which engage the inner cylindrical surface of the drill pipe to create a watertight chamber between the annular rubber seals, the enlarged diameter portion further being approximately equal in length to a pipe segment,

(3) introducing water into the chamber,

(4) introducing a freezing liquid into the internal pipe to freeze the water contained within the chamber thereby creating a thermal bridge between the internal pipe and the drill pipe which facilitates freezing the ground in segments surrounding the drill pipe, the freeze area being greater in diameter than the tunnel,

(5) thawing the water in the chamber,

(6) releasing evaporated freezing liquid through conduit to the atmosphere,

(7) providing rotary excavating means on one end of the drill pipe, the excavating means being supported on the outer surface of the drill pipe,

(8) rotating and axially advancing the excavating means sequentially toward the enlarged diameter portion of the drill pipe to remove frozen soil.

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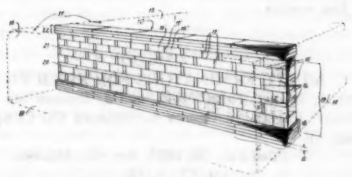
## 4,516,879
## FOAM SLABS IN MINE TUNNEL STOPPINGS

James A. Berry; Morton Sherman, both of St. Petersburg, Fla., and John W. Stevenson, Birmingham, Ala., assignors to The Celotex Corporation, Tampa, Fla.

Filed May 26, 1983, Ser. No. 498,362
Int. Cl.³ F21F 1/14; F24F 7/00
U.S. Cl. 405—132 26 Claims



1. A stopping for use in improving underground mine ventilation comprising an assembly of wall elements, said wall elements comprising:

(a) a plurality of rigid non-yielding components, and

(b) a plurality of compliant sealing members, the sealing members being composed of flame spread-resistant and gas flow-impervious material, the rigid components and sealing members being arranged in courses which extend from one side to the other of a tunnel opening and from the floor to the ceiling of the opening to form a wall which extends over substantially the entire cross section of the opening being stopped, the sealing members being positioned at the top and bottom perimeters of the wall and between the rigid components so as to (i) accommodate convergence loads imposed on the wall, and (ii) form, together with the rigid components, a barrier against the flow of gas through the tunnel.

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## 4,516,880
## UNDERWATER TRENCHING APPARATUS

Charles F. Martin, P.O. Box 197, Porter, Tex. 77365

Filed Apr. 19, 1982, Ser. No. 369,488
Int. Cl.³ F16L 1/04; E02F 5/02
U.S. Cl. 405—160 20 Claims

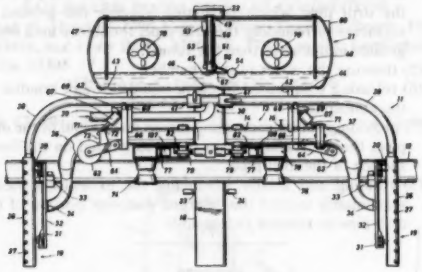
1. An underwater trenching apparatus for burying a line member such as a pipeline, beneath the bottom of a body of water, comprising:

(a) a frame for positioning on the line member to be buried beneath the bottom;

(b) means supported by said frame for excavating a trench in the bottom beneath said frame;

(c) a pair of line member engaging rollers supported by said

frame and arranged to engage said line member on directly opposite face portions thereof;
(d) variable force producing means for urging both of said rollers into gripping contact with said line member;
(e) flexible mounting means for said rollers for urging said rollers toward the line member so that said rollers can only move toward and away from the line member;



(f) wherein said rollers are comprised of a deformable material and have a longitudinally concave exposed face to provide mating contact between the outside surface of the roller and a circular line member; and
(g) further including voids formed within the wall of said rollers to permit said roller wall to partially collapse into a shape conforming to the outer peripheral surface of the line member.

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**4,516,881**

**MULTITERMINATORS FOR RISER PIPES**

**Pierre A. Beynet, Tulsa, Okla., and J. Thomas von Aschwege, Pinner, England, assignors to Standard Oil Company, Chicago, Ill.**

**Filed Feb. 25, 1982, Ser. No. 352,496**
**Int. Cl.³ E21B *43/01***
**U.S. Cl. 405—195** **9 Claims**

1. A multiterminator assembly for use with a riser pipe used to anchor a floating structure, comprising:
(a) a first terminator comprising a tubular assembly, having a mid-section of cylindrical shape and selected length and diameter, with two conical end portions; a first conical end portion of lesser conical angle and greater length than the second conical end portion;
(b) a vertical tubular sleeve attached to and downwardly depending from said floating structure and carrying a first horizontal bearing at the level of said mid-section of the first terminator;
(c) the first conical end portion of said first terminator connected to the top end of said riser pipe which is anchored at its bottom end in the earth below the mudline;
(d) a second terminator having two conical end portions;
(e) the second conical end portion of said first terminator connected to a first length of riser pipe which is connected to a first end of said second terminator; the second end of said second terminator connected by a second length of riser pipe to the floating structure; and
(f) a second bearing carried inside said tubular sleeve at the level of said second terminator.

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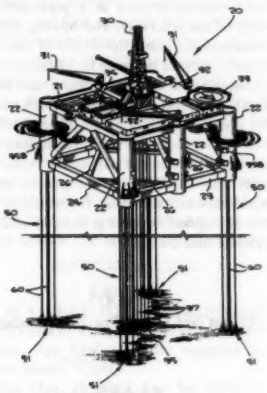
**4,516,882**

**METHOD AND APPARATUS FOR CONVERSION OF SEMI-SUBMERSIBLE PLATFORM TO TENSION LEG PLATFORM FOR CONDUCTING OFFSHORE WELL OPERATIONS**

**John H. Brewer, Irvine, and Hobart A. Cress, Rancho Palos Verdes, both of Calif., assignors to Fluor Subsea Services, Inc., Irvine, Calif.**

**Filed Jun. 11, 1982, Ser. No. 387,419**
**Int. Cl.³ E02B *17/00*; B63B *35/44***
**U.S. Cl. 405—224** **28 Claims**



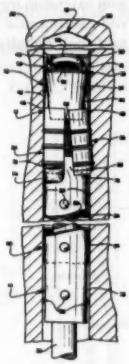
1. In a method of conducting offshore well operations including exploration drilling and production from a single floatable platform having vertical and horizontal buoyant members adapted to be ballasted and deballasted, provided with drilling and production equipment, and including means for anchoring and utilizing said platform in semi-submersible exploratory mode with catenary mooring and means for anchoring and using said platform in tension leg production mode with tension legs, comprising the steps of:
towing said platform to an ocean well site;
mooring said platform with virtual mass trap means in semisubmersible mode over said site with catenary mooring lines and temporary anchor means;
conducting exploration and drilling operations from said platform in semisubmersible mode at said site to establish production capabilities of said well site;
lowering and setting anchor guide means at selected anchor locations at said site and beneath said platform while said platform is in semisubmersible mode;
shifting said platform in semisubmersible mode for drilling at each anchor guide means;
setting permanent anchor members in the sea floor at said anchor guide means;
connecting tension leg means to said anchor members and to said platform;
initially tensioning said tension leg means to a selected tension;
releasing said platform from said catenary mooring mode;
rendering inoperable said mass trap means; and
further tensioning said tension leg means by deballasting certain buoyant members for operation of said platform in tension leg mode.

4,516,883

## MINE ROOF BOLT MOUNTING ASSEMBLY

Louie Zeitler, Brecksville, Ohio, assignor to Die-Matic Corporation, Brooklyn Heights, Ohio

Filed Apr. 1, 1983, Ser. No. 481,400
Int. Cl.[3] E21D 20/02
U.S. Cl. 405—260 4 Claims



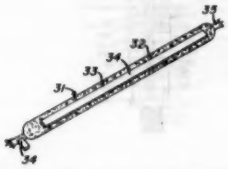
1. An assembly adapted to be received in an elongated opening in a body and to cooperate with the body to hold a bolt in a selected position relative to the body, said assembly comprising expandable anchor means for gripping a side surface of the opening, said expandable anchor means including retainer means for engaging the side surface of the opening and expander means for engaging an end portion of the bolt and forcing at least a portion of said retainer means outwardly away from a central axis of said expandable anchor means against the side surface of the opening to hold said assembly against movement relative to the opening, and tubular means connected with and extending axially from said expandable anchor means for engaging a body of adhesive material disposed between an outer side surface of said tubular means and the side surface of the opening at a location below said expandable anchor means to further hold said assembly against movement relative to the opening, said tubular means includes a rigid metal tube having a generally cylindrical configuration, said retainer means including a pair of rigid metal leaves each of which has a generally semi-cylindrical shape, an axially inner end portion of a first one of said leaves being fixedly connected to an end portion of said rigid metal tube, a generally U-shaped bail strap connected with axially outer end portions of said leaves, said bail strap having a pair of leg portions interconnected by a bight portion, an axially inner end portion of a second one of said leaves being disposed adjacent to the side surface of said rigid metal tube at a location diametrically opposite from the inner end portion of said first one of said leaves, said inner end portion of said second one of said leaves being movable diametrically outwardly away from an outer side surface of said rigid metal tube, said expander means including a nut disposed between said leg portions of said bail strap, said nut having a frustoconical outer side surface which tapers inwardly from a relatively large outer end portion of said nut disposed adjacent to said bight portion of said bail strap to a relatively small inner end portion disposed adjacent to the axially outer end portions of said leaves, said nut having internal thread means for engaging a threaded end portion of said bolt, said nut being movable axially inwardly toward said inner end portions of said leaves under the influence of force applied against said nut by the bolt to force the inner end portion of said second one of said leaves to move diametrically outwardly away from said first one of said leaves against the side surface of the opening.

4,516,884

## GROUTING COMPOSITION CARTRIDGE

Donald L. Douty, Franklin Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Sep. 1, 1983, Ser. No. 528,381
Int. Cl.[3] E21D 20/02
U.S. Cl. 405—261 10 Claims




1. A cartridge for grouting an anchor element in an elongated hole of a support structure, comprising (1) an elongated tubular casing fabricated of a frangible material capable of being punctured and shredded by an anchor element thrust into said cartridge and having a diameter between enclosed ends sufficient to enable said cartridge to be introduced into said hole; (2) a substantially homogeneous mixture of cartridge filler ingredients comprising (a) a dry hydraulic cement powder, and (b) water-containing capsules substantially uniformly dispersed in said cement powder that fills the interior of said tubular casing between said enclosed ends; and (3) a flexible reinforcing member fixedly attached to said tubular casing to thereby add lengthwise rigidity to said casing; and wherein said capsules have inert, frangible shells enclosing droplets of water, and wherein said capsules are pressure sensitive and are capable of being progressively ruptured by the force of said anchor element being thrust into said cartridge when said cartridge is positioned in said hole to thereby dispense the water substantially uniformly throughout said cement powder to enable said water and said cement powder to thoroughly interact to form a flowable cement paste in contact with the hole wall and said anchor element, which when solidified forms a grout about said anchor element to secure said anchor element to said support structure.

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4,516,885

## METHOD AND APPARATUS FOR COMBINING RESIN BONDING AND MECHANICAL ANCHORING OF A BOLT IN A ROCK FORMATION

Frank Calandra, Jr., Johnstown, Pa., assignor to Jennmar Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 497,113, Jul. 5, 1983, which is a division of Ser. No. 209,134, Nov. 21, 1980, Pat. No. 4,419,805. This application Apr. 19, 1984, Ser. No. 602,204
The portion of the term of this patent subsequent to Dec. 13, 2000, has been disclaimed.
Int. Cl.[3] B23P 25/00; F16B 13/06
U.S. Cl. 405—261 9 Claims

1. A method of anchoring a bolt in a bore hole comprising the steps of,

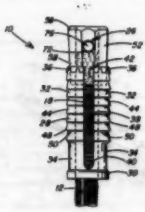
positioning a camming plug having an internally threaded bore and an outer surface into the upper portion of an expansion shell with a portion of said camming plug outer surface in abutting relation with a portion of the inner surface of a plurality of fingers extending upwardly from a lower ring portion of said expansion shell,

positioning said expansion shell on the threaded end portion of said bolt and threadedly engaging said camming plug to the end of said threaded portion of said bolt in a manner that said camming plug is movable longitudinally on said bolt threaded portion,

inserting a bonding material into a bolt hole,

inserting said bolt with said camming plug threadedly engaged thereto into a bore hole,

rotating said bore in a preselected direction while maintaining said camming plug in fixed relation with said expansion shell to thereby mix at least a portion of said bonding material, and



thereafter rotating said bolt in said same preselected direction and moving said camming plug on said bolt to expand the fingers of said expansion shell and apply a tension to said bolt in said bore hole.

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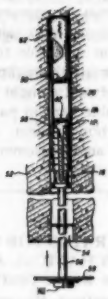
**4,516,886**

## COMBINED RESIN-MECHANICAL MINE ROOF SUPPORT ANCHOR

**Raymond L. Wright, Syracuse, N.Y., assignor to The Eastern Company, Naugatuck, Conn.**

**Filed May 14, 1984, Ser. No. 610,042**
**Int. Cl.³ E21D *20/02***
**U.S. Cl. 405—261** **8 Claims**



1. An expansion anchor assembly for use on a threaded rod of predetermined diameter, in conjunction with a breakable cartridge of resin components which harden upon mixing to anchor said rod in a drill hole, in cooperation with said expansion anchor, the latter comprising, in combination:

(a) an expansion shell;

(b) a tapered nut having a threaded opening for engagement with said threaded rod and adapted to be advanced axially into said shell to effect outward, radial expansion thereof;

(c) bail means including a pair of bail legs secured on opposite sides of said shell and connected by a bail medial portion extending over said nut to retain the latter in assembled relation with said shell, said bail medial portion including breakable means positioned for contact by the end of said rod to limit the extent of advance thereof through said nut;

(d) a bail extension including a pair of extension legs connected by an extension medial portion having a sharp projection extending outwardly therefrom in a direction opposite to that of said bail medial portion; and

(e) attachment means fixedly positioning said bail extension with respect to said shell and bail means with said extension medial portion aligned with and spaced from said bail medial portion along the axis of said anchor;

(f) said breakable means being constructed and arranged to cause said anchor to rotate together with said rod until application of a restraint to rotation of said shell, whereupon application of excess torque to said rod will cause said breakable means to fracture and permit further threaded advance of said rod through said nut until the end of said rod abuts said extension medial portion, continued rotation of said rod causing said nut to move axially thereon and expand said shell radially outward.

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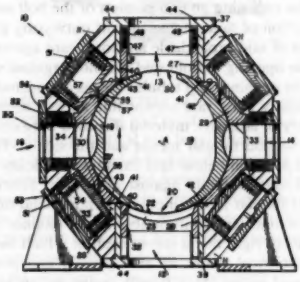
**4,516,887**

## FEEDER DEFLECTION COMPENSATION

**Ole J. Richter, Karlstad, Sweden, and Johan C. F. C. Richter, Oslo, Norway, assignors to Kamyr, Inc., Glens Falls, N.Y.**

**Filed Jul. 27, 1983, Ser. No. 517,747**
**Int. Cl.³ B65G *53/30, 53/46***
**U.S. Cl. 406—63** **14 Claims**



1. A high-pressure transfer device including: a cylindrical pocketed rotor containing a plurality of diametrically through-going pockets, said rotor rotatable about an axis; a housing enclosing said rotor and having an exterior periphery having four ports including a high-pressure inlet opposite a high-pressure outlet, and a low-pressure intlet opposite a low-pressure outlet; means for mounting said rotor for rotation with respect to said housing ports about said given axis of rotation in a given direction of rotation; screen means for screening particulate material above a predetermined size out of the liquid passing through at least one of said ports; at least one high-pressure shoe associated with said high-pressure inlet and at least one high-pressure shoe associated with said high-pressure outlet; at least one low-pressure shoe having an opening aligned with said low-pressure inlet and at least one low-pressure shoe having an opening aligned with said low-pressure outlet; each of said shoes disposed between said rotor and said housing; and

retainer means for guiding radial movement of all of said shoes, and preventing rotation thereof with respect to said housing.

4,516,888

## PNEUMATIC DISPATCH SYSTEM HAVING A PLURALITY OF FORWARDING TUBE PATHS AND AN ARRANGEMENT TO TRANSFER BETWEEN TWO TUBE PATHS

Hans-Joachim Kardinal, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

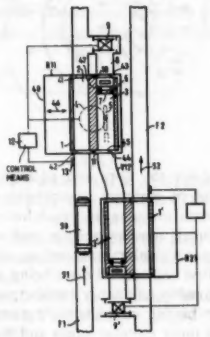
Filed Feb. 16, 1983, Ser. No. 466,895

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1982, 3206075

The portion of the term of this patent subsequent to Mar. 20, 2001, has been disclaimed.

Int. Cl.³ B65G 51/24

U.S. Cl. 406—182 18 Claims



1. In a pneumatic dispatch system having a plurality of forwarding tube paths, each tube path comprising a plurality of tubular sections arranged in a single tube line for transporting pneumatic dispatch cases, and means for pneumatically transporting the dispatch cases in both directions along each tube line in a single-tube communication mode, said system having connecting means for selectively connecting two forwarding tube paths, said connecting means comprising each of the two tube paths having a pneumatic post station with a housing inserted between two sections of the single-tube line and a connecting tube line extending between the housings of the two post stations, each of said post stations having a first tube chamber open at each end and means for moving the first tube chamber in said housing between a first position in alignment with the two tube sections of the forwarding tube path and a second position out of alignment therewith, the improvements comprising each of the first chambers being connected to a second tube chamber extending parallel thereto, said second tube chamber being a reception chamber having one open end and a second end provided with retaining means for blocking passage of a dispatch case being pneumatically transported in the tube path when the second chamber is aligned with the tube sections of the forwarding tube path and retaining the case in the second chamber, said connecting tube line being connected to the housing of each station at a distance from the tube section of the tube path equal to the spacing between the axes of the first and second chambers so that when the first chamber is in the first position, the one open end of the reception chamber is aligned with the connecting tube line for transfer of a case therebetween, each of the second chambers having means for forming a port for passage of air communicating with the reception chamber at a point spaced from the one open end, and each of the housings of the post stations having a feed line, said feed line having one end connected to the forwarding tube path and the other end positioned for communication with the means for forming a port when the second chamber has the one open end aligned with the connecting tube line, said feed line having valve means for controlling the flow therein.

4,516,889

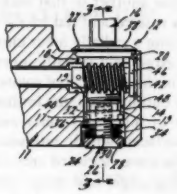
## PRECISION ADJUSTABLE CUTTING TOOL

Robert M. Ortlieb, Southfield, Mich., assignor to DeVlieg Machine Company, Royal Oak, Mich.

Filed Sep. 7, 1982, Ser. No. 415,663

Int. Cl.³ B23B 29/02

U.S. Cl. 408—152 26 Claims



1. In a cutting tool assembly including a tool having an opening provided with a seat, an internally-threaded collar member having a surface engageable with said seat, externally-threaded tool bit adjustment means threadably engaging said collar member, said tool bit adjustment means being axially movable relative to the axis of said opening in response to rotation of said collar member, for selectively adjusting the position of a cutting tool bit relative to said tool, the improvement comprising: retention means engaged with said tool bit adjustment means for resiliently biasing said surface of said collar member against said seat to maintain said collar member in a self-centering relationship relative to said opening; first gear means on said collar; worm gear means in a driving relationship with said first gear means, rotation of said worm gear means causing rotation of said collar member in order to perform fine adjustments to the axial position of said tool bit adjustment means relative to said opening, said worm gear means and said retention means cooperating to maintain said collar member in said self-centering relationship as said fine adjustments are performed; said seat of said opening being conical in shape and said surface on said collar member having a complimentary conical shape, said conical seat and said conical surface tending to maintain said collar member in said self-centering relationship; said tool further having at least one longitudinally-extending aperture extending therethrough; and shaft means rotatably disposed within said aperture, said shaft means being drivingly connected to said worm gear means for rotating said worm gear means in order to perform said fine adjustment of the position of said tool bit adjustment means.

4,516,890

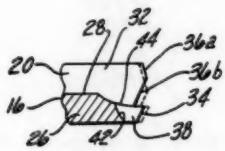
## ANNULAR CUTTER

Michael Beharry, Flint, Mich., assignor to Hougen Manufacturing, Inc., Flint, Mich.

Filed Sep. 12, 1983, Ser. No. 531,347

Int. Cl.³ B23B 41/02, 51/00

U.S. Cl. 408—204 5 Claims



1. An annular hole cutter comprising a cutter body having a generally circular cylindrical side wall provided with a plurality of cutting teeth spaced circumferentially around the lower end thereof, a plurality of flutes extending upwardly around the side wall from the lower end thereof, each tooth being connected with the next adjacent tooth by a circumferentially

extending web disposed radially adjacent the inner periphery of the side wall and having a thickness of about one-half the thickness of said side wall, said webs being juxtaposed radially with said flutes, each flute having circumferentially spaced leading and trailing side walls and a circumferentially extending inner wall which defines the radially outer face of the web, each tooth having two radially extending cutting edges disposed relative to one another so that each cuts a separate chip when the cutter is rotated and fed into a workpiece, said cutting edges comprising a radially inner cutting edge and a radially outer cutting edge, said radially inner cutting edge being spaced forwardly in the direction of rotation of the cutter from said radially outer cutting edge, the bottom face of each tooth comprising a pair of inner and outer radially oppositely inclined back-off surfaces which intersect in a downwardly extending crest, the lower forward end of said crest intersecting the outer cutting edge, said inner cutting edge extending outwardly from the inner periphery of the cutter for a distance less than the thickness of said web and the radially outer cutting edge extending inwardly from the outer periphery of the cutter and into said web for a distance greater than the depth of said flute, there being a shoulder extending circumferentially between the radially outer end of the inner cutting edge and the radially inner end of the outer cutting edge, the radially outer back-off face of alternate teeth being relieved vertically upward relative to the outer back-off faces of the teeth disposed circumferentially intermediate the alternate teeth and the radially inner back-off faces of said intermediate teeth being relieved vertically upward relative to the inner back-off faces of the alternate teeth.

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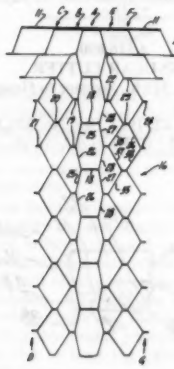
**4,516,891**

## SUSPENDED TYPE CELLULAR VOID FILLER

**Paul A. Wnuk, Stockton, Calif.; Thomas J. Hamilton, Palos Heights, Ill.; Anthony Trassare, Jr., Lodi, Calif., and Michael J. Oliver, Park Forest South, Ill., assignors to Down River International, Inc., Sacramento, Calif.**

**Filed Jun. 30, 1982, Ser. No. 393,662**
**Int. Cl.³ B61D *45/00*; B32B *3/12***
**U.S. Cl. 410—154** **9 Claims**



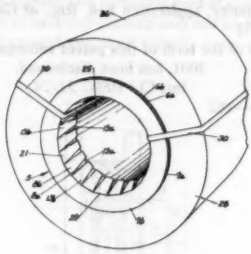
**9.** An expansible cellular void filler having a plurality of rows of directly hingedly connected cell walls which extend in the direction of expansibility of the void filler as the void filler is expanded, one or more of said rows being shorter than the others.

**4,516,892**

## PROTECTOR FOR THE CORE AND ADJACENT EDGES AND FACE PORTIONS OF A COIL OF MATERIAL

**Dominic Curro, Jr., Mason, Ohio, assignor to Loroco Industries, Inc., Cincinnati, Ohio**

**Filed May 2, 1983, Ser. No. 490,961**
**Int. Cl.³ B65D *85/66*; B61D *45/00***
**U.S. Cl. 410—155** **9 Claims**



**1.** A protector for the core and adjacent edges and face portions of a coil of material, comprising first and second substantially identical circular discs each having an outer annular portion, an inner annular portion and a central circular aperture forming a circular inner edge, said outer annular portions of said first and second discs being joined together in superposed relationship, said inner annular portions of said first and second discs having cuts therein extending transversely thereof from said inner circular edges and forming a plurality of tabs capable of being bent at a substantially right angle to said outer annular portions, said cuts of said first disc each lying at the same acute angle to a radial line intersecting the same point as said cut on said circular inner edge of said first disc, said cuts of said second disc each lying at the same acute angle to a radial line intersecting the same point as said cut on said circular inner edge of said second disc, said angle of said cuts of said second disc being substantially equal to said angle of said cuts of said first disc and constituting the reverse thereof, said tabs of said first and second discs forming a continuous band when positioned at a substantially right angle to said outer annular portions, said continuous band of tabs being so sized as to be just nicely received in said core of said coil.

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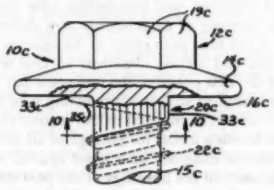
**4,516,893**

## SHEET METAL SCREW

**Gerald D. Barth, South Elgin, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 316,260, Oct. 29, 1981, , which is a continuation-in-part of Ser. No. 276,228, Jun. 22, 1981, abandoned. This application Sep. 29, 1982, Ser. No. 426,459**
**Int. Cl.³ F16B *39/30*, *5/02***
**U.S. Cl. 411—184** **19 Claims**




**1.** A rotary fastener for use in attachment of a first panel with a clearance hole to a second panel, said fastener comprising a generally cylindrical shank, an enlarged head having drive-

inducing surfaces on one end of said shank, said head having an under surface, said cylindrical shank having at least one helical thread thereon, said thread extending outwardly for a predetermined height that extends from a thread root diameter to a thread crest diameter, a helical ramp beginning substantially at one termination point of said helical thread and forming a continuation thereof, said ramp extending along the shank to said head under surface, said ramp having a generally axially oriented surface which varies in axial length from one end of said ramp to another, said ramp having a generally radially oriented surface of generally increasing radial dimension from one end of said ramp to another and said ramp radially extending surface having a minimum radial extent at a point where said ramp axially oriented surface is at a maximum length, whereby said helical ramp will deflect outwardly some of the material of at least one of said panels thereby greatly increasing the stripping torque of the screw relative to the panel.

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**4,516,894**

## LOAD PRESSURE FEEDBACK SYSTEM HAVING AT LEAST ONE CONTROL VALVE FOR CONTROLLING AN APPARATUS

**Siegfried Stolpp, Niederfischbach, Fed. Rep. of Germany, assignor to ALB Klein GmbH & Co. KG, Niederfischbach, Fed. Rep. of Germany**

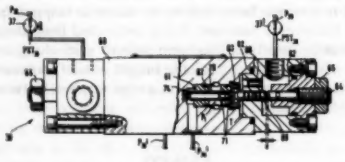
**PCT No. PCT/DE81/00099, § 371 Date Feb. 22, 1982, § 102(e) Date Feb. 22, 1982, PCT Pub. No. WO82/00112, PCT Pub. Date Jan. 21, 1982**

**PCT Filed Jun. 27, 1981, Ser. No. 355,585**

**Claims priority, application Fed. Rep. of Germany, Jun. 28, 1980, 3024402**

**Int. Cl.³ B25J *3/04*; F15B *13/14***

**U.S. Cl. 414—5** **10 Claims**



1. In a load pressure feedback system having at least one load pressure control valve for controlling a load arm in response to a control arm based on load pressures respectively in a first line connected to the load arm and a second line connected to the control arm, the improvement wherein said control valve comprises a housing having a first connection for a fluid at a pressure representative of the pressure in the load arm and a second connection for a fluid at a pressure representative of the pressure in the control arm, a throttle aperture in said line connected to the load arm, a screw-in aperture in said housing between the first and second connections, a first piston in said housing subject to the pressure at said first connection for undergoing displacement in response to varying pressures at said first connection, a control sleeve in said housing, and a control piston in said control sleeve forming control edges with said sleeve for balancing the pressures at said connections, said first piston and control piston being coaxially arranged in abutting relation under resilient action.

**4,516,895**

## BAG FORMING MACHINES OF THE TOP STACKING TYPE WITH STACK CLAMP

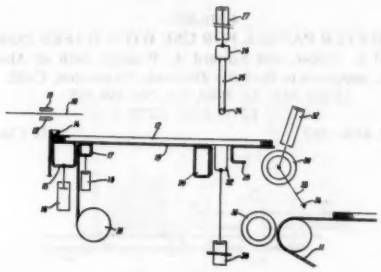
**Arthur Hall, Rochdale, England, assignor to Alpine Plastics Machinery Limited, Runcorn, England**

**Filed Mar. 31, 1983, Ser. No. 480,864**

**Claims priority, application United Kingdom, Apr. 5, 1982, 8210065**

**Int. Cl.³ B65H *31/30***

**U.S. Cl. 414—43** **9 Claims**



1. In a bag forming machine of the top stacking type having a delivery line for rhythmically top stacking formed bags at a stacking station, the improvement comprising a support at the stacking station for the rear end of the stack, and means at the stacking station for removing a stack of bags, when formed, from the station without interrupting the rhythm of bag delivery to the station, said means comprising a clamp acting on the stack and movable transversely of the stack so as to move the front end of the stack transversely and apply a dragging motion to the rear end of the stack to move the rear end of the stack forwardly sufficiently to move the rear end of said stack off said support to permit said support to receive and support the rear end of the first bag of the next stack to be formed.

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**4,516,896**

## APPARATUS FOR REMOVAL OF PAVING MATERIAL

**Joseph J. Freebery, 2626 Sherwood Dr., Wilmington, Del. 19808**

**Filed Sep. 16, 1982, Ser. No. 419,051**

**Int. Cl.³ E02F *3/96***

**U.S. Cl. 414—740** **2 Claims**

1. Apparatus for removing paving material from a paved surface comprising, in combination, an arm member comprised of a rear arm element and a forward arm element; said rear arm element being pivotably secured to a mechanized unit and to said forward arm element whereby said forward arm element is adapted to pivot in the direction of said mechanized unit, a rigid stationary member attached to the inboard surface of said forward arm element and having a lower extremity comprising a flat surface, a horizontally tapered elongated blade pivotably

attached to the extremity of the forward arm element, being at least as wide as said forward arm element and having a slight curvature on its upper surface, oriented in the direction of the mechanized unit and adapted to pivot in order to make contact with the flat lower extremity of the stationary member whereby a section of paving can be gripped between the upper surface of the horizontally tapered elongated blade and the lower extremity of the stationary member, and means associated with the mechanized unit for causing the aforesaid members to effect pivoting movements in operational sequence.

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**4,516,897**

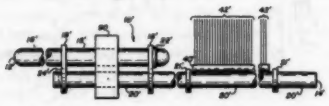
**CANTILEVER PADDLE FOR USE WITH WAFER BOATS**

**Wendall L. Snider, and Edward A. Wagner, both of Alamo, Calif., assignors to Berkeley Glassiab, Pleasanton, Calif.**

**Filed May 23, 1983, Ser. No. 496,835**

**Int. Cl.³ F27D** *5/00;* **B27B** *9/14*

**U.S. Cl. 414—180** **18 Claims**



1. A cantilever paddle for supporting and suspending wafer boats within a wafer fabrication furnace with loaded wafers, and paddle spaced from the interior walls of said furnace and comprising:

a first support means supported by and mounting in a wafer paddle drive device, the support means being fabricated from a single refractory material; and

a suspension means for supporting and positioning said wafer boats in suspension within said furnace, the suspension means being positioned below the support means, and including at least one alignment brace, said alignment brace having portions defining at least one aperture through which said suspension means may pass through, and the suspension means being completely located within said furnace when said panel is in its operational position.

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**4,516,898**

**DEVICES FOR EXTRACTING SOLID MATERIALS IN BULK IN THE FINELY DIVIDED STATE, FROM THE BOTTOM OF A SILO**

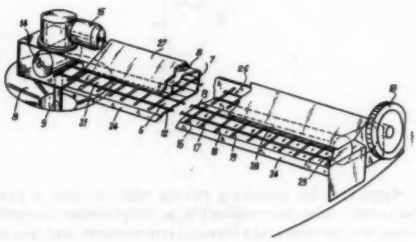
**Laurence Cantenot, 12, avenue de la Division Leclerc, 92340 Bourg la Reine, France**

**Filed Mar. 3, 1982, Ser. No. 354,283**

**Claims priority, application France, Mar. 12, 1981, 81 04981**

**Int. Cl.³ B65G** *65/42*

**U.S. Cl. 414—309** **4 Claims**



1. A device, for removing a residual pile of granular or pulverulent matter from a silo, said device comprising:

a means for removing material;

a means for moving said means for removing material over a floor of a silo so as to sweep across said floor as said means for removing material moves, said means for removing material including a conveyor for pushing granular matter towards an evacuation orifice in said floor of said silo;

said means for removing material including an elongated box having a bottom side, a top side, and a vertical side interconnecting said top and bottom sides, said top and bottom sides being substantially parallel to said floor of said silo, said conveyor being enclosed within said elongated box, an upper surface of said bottom side being disposed slightly above said floor of said silo, and an open side of said elongated box which is open so that, when said elongated box is advanced toward a residual pile, material from said residual pile enters said elongated box;

said conveyor being an elongated loop having substantially parallel spaced apart upper and lower elongated sections; said conveyor including at least one flexible elongated member bearing a plurality of spaced apart transverse bars, each of said transverse bars having a height substantially less than a height of said open vertical side of said elongated box; said conveyor being mounted on a plurality of pulleys, at least one of which is a drive pulley, each of said transverse bars having a lower edge; each of the lower edges of said transverse bars being in mating contact with said upper surface of bottom side of said vertical box along substantially all of said upper surface of said bottom side exposed to said residual pile by said open vertical side of said elongated box; said transverse bars in said lower elongated section being adapted to scrape an inside surface of said horizontal bottom side of said elongated box, so as to move said material from said residual pile towards a trap located in said horizontal bottom side of said elongated box, said trap being located just above said evacuation orifice in said silo;

said top side of said elongated box forming a portion of a canopy for limiting the quantity of said material from said residual pile which enters said box and which canopy prevents weight of any of said material atop said canopy from interfering with movement of material by said transverse bars beneath said canopy; whereby said material which has entered said elongated box is moved in generally plug flow, since the material higher than the height of said transverse bars rests upon material trapped between said transverse bars and, being protected from the weight of matter overlying said top side of said elongated box, said material higher than the height of said transverse bars is carried along with said material trapped between said transverse bars.

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**4,516,899**

**SHEET FEEDING APPARATUS**

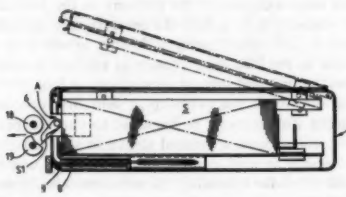
**John Wood, Southsea; Christopher M. Tinson, Rustington, and Stuart M. Jenkins, Bognor Regis, all of England, assignors to De La Rue Systems Limited, London, England**

**Filed Oct. 5, 1982, Ser. No. 432,864**

**Claims priority, application United Kingdom, Oct. 5, 1981, 8130014**

**Int. Cl.³ B65H** *3/46*

**U.S. Cl. 414—330** **8 Claims**



8. Sheet feeding apparatus comprising a holder for a stack of

sheets having a sheet outlet, and single-sheet removing means including a suction feeder acting on an end sheet of the stack for removing sheets singly from that end through the sheet outlet and further comprising:

means sensing the failure of the single-sheet removing means to remove a sheet from the end of the stack and providing a failure signal; and

multiple-sheet feeding means including a member movable independently of the operation of the single-sheet feeding means in response to the failure signal to urge a batch consisting of a plurality of sheets from the same end of the stack through the sheet outlet.

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**4,516,900**

## DE-PALLETIZER

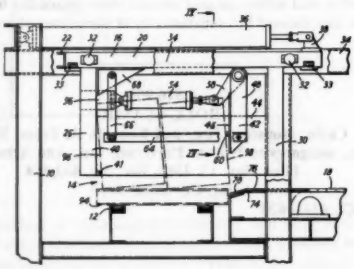
**Kenneth F. C. Avey, Epping, England, assignor to The British Matthews Limited, Epping, Great Britain**

**Filed Sep. 29, 1982, Ser. No. 426,766**

**Claims priority, application United Kingdom, Aug. 12, 1982, 8223242**

**Int. Cl.³ B65G 49/00**

**U.S. Cl. 414—417** **7 Claims**



1. In a de-palletizer for removing articles such as kegs or drums from a pallet where the de-palletizer is of the type having

(a) a pallet conveyor for moving loaded pallets to an unloading station,

(b) pusher means for pushing articles from a pallet at the unloading station onto a discharge table, and

(c) means for discharging articles from the discharge table, the improvement wherein the pusher means includes tilting means for tilting articles on edge in the direction opposite to the direction in which the articles are pushed from the pallet onto the discharge table, the tilting means traveling with the articles as the articles are pushed along the pallet.

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**4,516,901**

## MOVABLE LIFTING AND DEPOSITING DEVICE FOR PORTABLE CONTAINERS, E.G., CABINS, CONTAINERS, SHELTERS OR THE LIKE

**Reinhold Riedl, Gensingen, Fed. Rep. of Germany, assignor to Haacon hebetechnik GmbH, Fed. Rep. of Germany**

**Filed Jul. 13, 1983, Ser. No. 513,522**

**Claims priority, application Fed. Rep. of Germany, Jul. 17, 1978, 3226882**

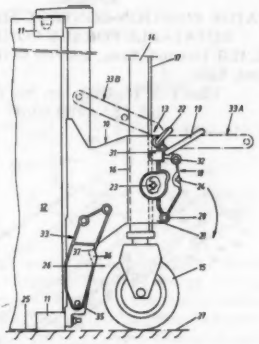
**Int. Cl.³ B60P 1/12**

**U.S. Cl. 414—458** **10 Claims**

1. A movable lifting and depositing device for portable containers, e.g., cabins, containers, shelters or the like, with rack and pinion jacks connected by means of brackets to the corners of the containers, the jacks having racks for the containers which are provided on movable columns having track wheels, the columns being raised for depositing of the container, e.g., on the ground, or for lifting of the wheels by the rack and pinion jacks to the level of the container bottom, characterized in that:

(a) each rack and pinion jack (**13**) has a swivel mechanism (**18**) with two vertically spaced work positions;

(b) the swivel mechanism (**18**) in its bottom work position, being folded down from a main column guide (**16**) onto the associated bracket (**10**), for connection with an auxiliary column guide (**33**) arranged beneath the main column



guide (**16**), which can be removed when the swivel mechanism (**18**) of the associated column support (**14**) is in the top work position; and

(c) stop means (**29**) between the main column guide (**16**) and the associated rack (**17**) and column (**14**) to enable movement of the swivel mechanism (**18**) into one of said two work positions when the lifting and depositing device is loaded.

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**4,516,902**

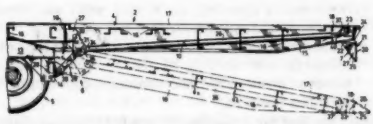
## BUMPER APPARATUS FOR LOW BED TRAILER

**Donald F. Matson, Mitchell, S. Dak., assignor to Western AG-Sales Inc., Mitchell, S. Dak.**

**Filed Aug. 23, 1982, Ser. No. 410,488**

**Int. Cl.³ B60P 1/28**

**U.S. Cl. 414—480** **12 Claims**



1. A low-bed trailer adapted to be connected to a powered vehicle comprising,

a bed structure for supporting a load and including a wheel assembly for transport of said bed structure,

connection means attaching a central portion of said bed structure to said wheel assembly, said bed structure extending forwardly of said wheel assembly to a tractor connection and extending rearwardly of said wheel assembly, said connection means permitting pivoting of the bed structure between a substantially horizontal transport position and a tilted loading position,

a bumper/ramp unit secured to the bed structure and movable between a first position defining a depending position extending substantially downwardly of said bed structure and a second position defining an extension of said bed structure, and

a separate mechanical linkage means connected to said wheel assembly and to said bed structure and to said bumper/ramp unit and operable by said pivoting of said bed structure to move said bumper/ramp unit between

said first and second positions, said separate mechanical linkage being directly moved by pivoting of said bed structure relative to said wheel assembly to move said bumper/ramp unit between said first and second positions in response to positioning said bed structure between said horizontal transport position and said tilted loading position.

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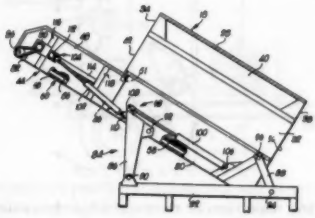
**4,516,903**

## ELEVATOR POSITION-CONTROL MECHANISM FOR ROTATABLE FORAGE CONTAINER

**Amos G. Hill, Hesston, Kans., assignor to Hesston Corporation, Hesston, Kans.**

**Filed Feb. 16, 1983, Ser. No. 466,974**
**Int. Cl.³ A01D 90/00**
**U.S. Cl. 414—491** **9 Claims**



1. A vehicle for use in transporting harvested crops comprising:

a mobile frame;

a crop container having a top, a bottom, and sides extending between said top and bottom,

one of said sides having a crop entry opening therein for filling said container with crop material;

means mounting said container on said frame for movement into and out of a tilted position in which said bottom is sloped generally upwardly and outwardly,

a second one of said sides having an unloading spout shiftable from a normally raised position in which it serves as a crop confining and containing portion of the container to a lowered position generally aligned with and as an extension of said bottom in which it is disposed for unloading crop from the container;

power means operably associated with said container for effecting said movement thereof; and

mechanism responsive to said movement of the container for effecting said shifting of the spout into and out of its lowered position as the container is moved into and out of its tilted position,

said mechanism including means for selective shifting of said spout independently of the position of said container.

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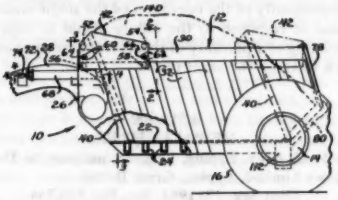
**4,516,904**

## EJECTOR WAGON

**Lovel R. Simmons, P.O. Box 199, Flora, Miss. 39071**

**Continuation of Ser. No. 318,620, Nov. 5, 1981, abandoned. This application May 21, 1984, Ser. No. 611,935**
**Int. Cl.³ B60P 1/00**
**U.S. Cl. 414—517** **7 Claims**

1. An ejector wagon comprising a body having sidewalls and a floor, said sidewalls sloping upwardly and outwardly from said floor to upper edges and having substantially flat inner surfaces, said walls having horizontal rails adjacent said upper edges, a rear end having an openable closure, wheels rotatably mounted from said body for moving wagon over the ground or the like, a gooseneck extending forwardly from said wagon for attachment to a tractor, an ejector at the front of said body mounted transversely thereof for movement of said ejector from the front of said body toward the rear thereof, said ejector including a substantially upright plate inclined at a shallow angle to the vertical with the lower portion thereof being disposed rearwardly of the upper portion thereof, said plate having tapered side edges and conforming to the interior shape of said wagon body, hydraulic cylinder means mounted on said gooseneck and acting on said ejector for movement thereof, said gooseneck being otherwise free of hydraulic



cylinder means, and a plurality of carriages connected to said ejector and riding on said rails for movably mounting said ejector, said hydraulic cylinder means being directly connected to and acting on said ejector plate above the horizontal center line thereof but substantially at the center of area of said plate.

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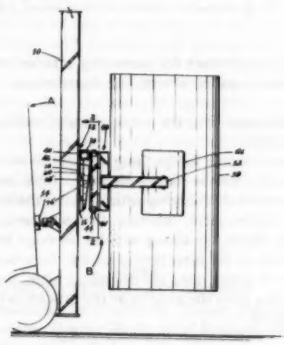
**4,516,905**

## ROLL CLAMP

**J. N. Cavin, Houston, Tex., and Kenneth A. Frees, St. Peters, Mo., assignors to Hoover Universal, Inc., Ann Arbor, Mich.**

**Filed Nov. 17, 1982, Ser. No. 442,354**
**Int. Cl.³ B66F 9/18**
**U.S. Cl. 414—620** **9 Claims**



1. A roll clamp for being carried by the lift mast of a lift truck or like vehicle for picking up and transporting rolls or like cylindrical objects, said clamp including a pair of clamp arms swingably disposed relative to one another for closing and opening by movement toward and away from each other, means for closing and opening of said clamp arms, clamp pads at the distal ends of said arms for contacting the surfaces of such roll or like cylindrical object, and a base for being mounted upon said lift mast for the raising or lowering of said arms to a desired vertical position by said lift mast, a rotator providing rotation of said arms relative to said mast about an axis of clamp rotation extending forwardly from said mast, and characterized by an attachment structure carried by said rotator for being rotated by said rotator about said axis of clamp rotation, a frame pivotally secured to said attachment structure for permitting angular movement of said frame relative to said base about an axis of clamp shifting, and means interengaging

said base and frame for causing said frame to rotate about said axis of clamp shifting as said attachment structure is rotated by said rotator about said axis of clamp rotation, whereby said clamp arms are automatically shifted during rotation of said clamp, said means interengaging said base and frame comprising a structural projection carried by said base and defining a surface inclined relative to said base, and follower means engaged with said inclined surface for causing said frame to be oriented relative to said surface as said attachment structure is rotated about said axis of clamp rotation.

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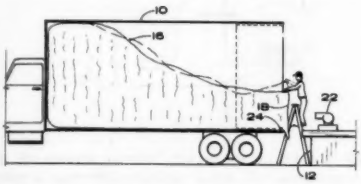
**4,516,906**

## FREE STANDING, WATERPROOF LINING FOR TRUCK INDUSTRY

**Reuben Krein, 812 N. 2nd, Fort Smith, Ark. 72903**

**Filed Jun. 9, 1983, Ser. No. 502,696**
**Int. Cl.³ B65D *88/12***
**U.S. Cl. 414—786** **8 Claims**




5. A method of installing a continuous film liner within an enclosed cargo container such as to serve as a moisture barrier protecting the cargo to be shipped within said container comprising the steps of:

(a) providing an enclosed cargo container having doors at one end wherein said container is intended to be used to ship moisture sensitive cargo;

(b) providing a deflated moisture proof film bag of dimensions slightly in excess of the interior dimensions of said container and having an opening in said film bag that corresponds to the doorway of said container;

(c) placing said deflated bag within said empty container such that the opening of said bag is located at the doorway of said container prior to placing cargo within said container;

(d) temporarily attaching the lower edge of said bag opening to the lower edge of said doorway such that said bag is directed into the interior of said container;

(e) physically restraining the upper edge of said bag opening from making contact with the upper portion of said container and container doorway;

(f) directing and blowing a stream of air into said bag opening while physically restraining the upper edge of said bag opening according to step (e) such that said air is directed towards the back end of said container;

(g) maintaining sufficient tension on said upper edge of said bag opening while said blowing of air into said bag continues such as to direct all of said air to the far end of said container thus causing the inflating bag to make continuous contact with the interior of said container from the frontmost portion of said container forward to the container doorway, thus displacing the air between the inflating bag and the interior of the container out the container doorway; and

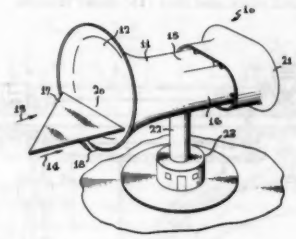
(h) temporarily attaching the bag opening of the inflated bag to the perimeter of the container doorway such as to allow cargo to be loaded within the container and inflated liner.

**4,516,907**

## WIND ENERGY CONVERTER UTILIZING VORTEX AUGMENTATION

**Samuel S. Edwards, 17401 Marilla St., Northridge, Calif. 91325**

**Filed Mar. 14, 1983, Ser. No. 475,219**
**Int. Cl.³ F03D *1/02***
**U.S. Cl. 415—2 A** **6 Claims**




1. In a wind energy conversion apparatus for converting the linear momentum of approaching wind energy into regions of high angular momentum comprising the combination of:

an elongated duct having an inlet bellmouth chamber at one end in fluid communication with a bifurcated mid-section leading into a pair of circular duct portions constituting an exit or exhaust for said duct;

propellor means movably carried in each of said duct exit portions to extract energy from the angular momentum of airflow passing through said duct from said inlet;

a swept airfoil wing having a variable angle of attack operably mounted on said duct at said inlet bellmouth chamber;

a diffuser augmenter secured to said duct encircling said exit or exhaust end of said duct in fixed spaced apart relationship thereto;

said elongated duct is provided with an upper, inner surface of marked reflex curvature in side elevational view wherein general airflow is conducted along a substantially sinusoidal path between said inlet and said exit whereby said circular duct portions characterized as enclosing a pair of concentrated, counter-rotating regions of high angular airflow momentum derived from the linear airflow momentum;

said elongated duct bifurcated mid-section includes curved inner wall surfaces constituting an angular airflow momentum guide, a vorticity augmenter and an angular modulator; and

said diffuser augmenter includes a flared outlet in fixed space relationship to said elongated duct outlet effective to lower the pressure across the aft facing area of said duct exit and which augments the airflow gradients through said upper, inner surface of marked reflex curvature.

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**4,516,908**

## POWER STAGE OF A GAS TURBINE

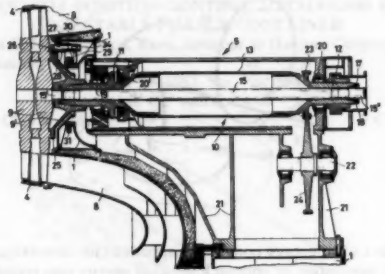
**Constantino Vinciguerra, Florence, Italy, assignor to Nuovo Pignone S.p.A., Florence, Italy**

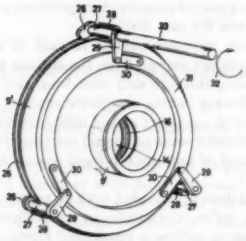
**Filed Apr. 8, 1982, Ser. No. 366,482**
**Claims priority, application Italy, Apr. 17, 1981, 21243 A/81**
**Int. Cl.³ F01D *5/30***
**U.S. Cl. 415—122 R** **6 Claims**

1. A gas turbine having a body (1) and a power stage (5) therein including a stator (4) and a rotor (9) with a plurality of blade-carrier disks, comprising:

a hollow power shaft (10) of the power stage (5) which support the disks in a cantilever fashion, and wherein said shaft (10) includes a pair of frustoconical hollow forged ends (11, 12) made of case-hardened and milled steel on their surfaces and connected together by a hollow central tube (13), wherein one frustoconical end (11) is inserted into a corresponding axial space (14) of the rotor (9) and

wherein the other frustoconical end (12) is supported by the body (10), a stud (15) extending through said hollow tube (13) and from said frustoconical ends (11, 12) having threaded ends (15', 15''), wherein one end (15') is releasably threaded into a correspondingly threaded portion (16) about the axial space (14) of the rotor (9) and wherein the other end (15'') is threaded into a nut (17) which cooperates with the other frustoconical end (15') to tighten and place said stud (15) under tension,





bearing means (19, 20, 20') within the body 1 which support said hollow shaft (10) at said case-hardened and milled frustoconical ends (11, 12),

gear means (22, 23, 24) which are connected to said shaft (10) for taking the drive therefrom, and

cam means (26) on the body 1 which engage and support the rotor (9) in its correct central position as said stud (15) is released from the threaded portion (16) in the axial hollow space (14).

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**4,516,909**

## HELICOPTER ROTOR

**Vittorio Caramaschi, Gallarate, and Pier Luigi Castelli, Busto Arsizio, both of Italy, assignors to Costruzioni Aeronautiche Giovanni Agusta S.p.A., Italy**

**Filed Mar. 2, 1983, Ser. No. 471,344**

**Claims priority, application Italy, Mar. 11, 1982, 67303 A/82**

**Int. Cl.³ B64C *27/38***

**U.S. Cl. 416—134 A** **4 Claims**

1. A helicopter rotor comprising:

a central hub rotatable about its axis;

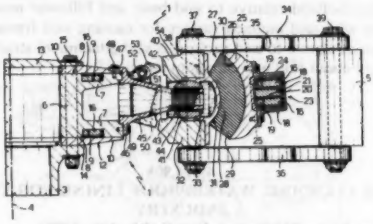
a plurality of blades connected to and extending in a substantially radial direction outward form the hub, each blade having associated therewith:

an attachment element (34) coupled to the blade and extending through an axial aperture (22) of the hub;

a first elastomeric coupling adapted to provide cooperation between the attachment element (34) and an inner surface of a peripheral bridge element (23) of the hub;

the peripheral bridge element (23) which closes the radially outward part of the aperture (22);

the aperture (22) located radially outward of a central support structure (12) of the hub wherein a radial projection (45) extends into the aperture and towards the bridge element (23), and the projection (45) further extends through a radial hole (33) formed in the attachment element (34), the projection (45) being connected to the hole (33) in an axially slideable manner, a second elastomeric coupling (41) being disposed between the projection (45) and the radial hole (33).



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**4,516,910**

## RETRACTABLE DAMPING DEVICE FOR BLADES OF A TURBOJET

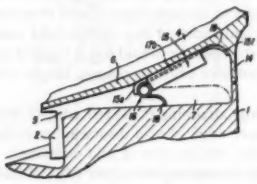
**Jean G. Bouiller, Brunoy; Jean-Claude L. Delonge, Corbeil Essonnes; Marcel L. A. Rigo, Paray Vieille Poste, and Didier G. Zietek, Seynod, all of France, assignors to S.N.E.C.M.A., Paris, France**

**Filed May 18, 1983, Ser. No. 495,830**

**Claims priority, application France, May 18, 1982, 82 08635**

**Int. Cl.³ F01D *5/10, 5/22***

**U.S. Cl. 416—190** **4 Claims**



1. A turbojet rotor assembly comprising:

a rotor disk having a rotational axis;

a plurality of blades mounted in a rim of said disk, each of said blades having a platform, platforms of adjacent ones of said blades defining a dihedral, and a space defined between each said dihedral and said desk rim;

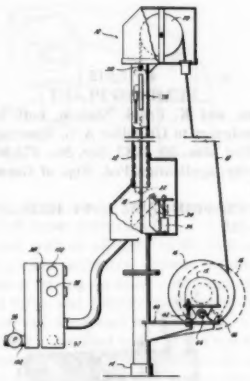
a damping element in each said space, each said damping element having an upper part forming a projecting dihedral whose shape corresponds to said dihedral defined by said platforms, each said damping element further comprising means for pivoting said upper part about an axis extending transverse to said rim axis and in a plane of said disk; and

an elastic element for elastically biasing said damping element to pivot said upper part such that said projecting dihedral contacts and presses against said dihedral defined by said platforms.

## 4,516,911
## SOLID STATE CONTROL SYSTEM FOR OIL WELL BAILER PUMP

**Karl A. Senghaas, and Peter Senghaas, both of San Antonio, Tex., assignors to Southwest Bailer Pump Company, San Antonio, Tex.**

**Filed Dec. 29, 1983, Ser. No. 566,831**
**Int. Cl.³ F04B *41/06, 49/00;* E21B *27/00***
**U.S. Cl. 417—2** **11 Claims**



1. An electric control system for an oil well bailer pump having a reversible electric motor for actuating a cable for lowering a bailer into an oil well, filling the bailer, raising the bailer, and dumping the oil into a tank and recycling comprising,

a winch up circuit for actuating the motor to raise the bailer,

an up overshoot circuit for opening the bailer for emptying oil therefrom, said overshoot circuit actuated by the end of the winch up circuit,

an up hold circuit for directing the draining oil into the tank and actuated by the end of the overshoot circuit,

a winch down circuit for lowering the bailer to the surface of the oil in the well, said winch down circuit actuated in response to the up hold circuit,

a down overshoot circuit for lowering the bailer a predetermined distance below the oil level in the well for filling said bail with oil, said down overshoot circuit actuated in response to the end of the winch down circuit,

a down hold circuit for allowing time for the bailer to fill, said down hold circuit actuated by the end of the down overshoot circuit, said down hold circuit actuating the winch up circuit, and

individual adjustable timers connected to each of the winch up, up overshoot, up hold, winch down, down overshoot and down hold circuits.

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## 4,516,912
## COMPRESSOR ARRANGEMENT FOR A HEAT PUMP INSTALLATION

**Wilhelm Leitgeb, and Siegfried Schönwald, both of Bad Neustadt, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

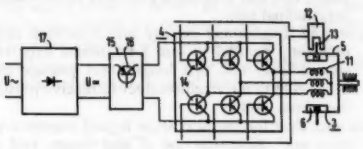
**Filed Mar. 17, 1983, Ser. No. 476,428**
**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1982, 3215814**
**Int. Cl.³ F04B *49/06***
**U.S. Cl. 417—45** **1 Claim**

1. In a compressor arrangement for a heat pump installation in which an electric motor is provided as the drive means for the compressor, the improvement comprising:

said electric motor comprising a permanent magnet-excited d-c motor having a stator winding and a rotor;

electronic commutating means for controlling said d-c motor so as to provide said stator winding with electrical current of the proper polarity at selected times in dependence on the position of said rotor;

d-c voltage control means coupled to said commutating means for controlling the starting current of said d-c



motor so as to maintain said starting current within permissible limits, said d-c voltage control means including means for controlling the speed of said d-c motor; and

rectifier means coupling said d-c voltage control means to an a-c electric network for powering said motor;

said compressor comprising a radial piston compressor.

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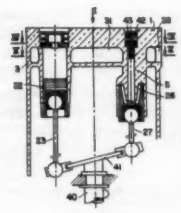
## 4,516,913
## MULTISTAGE DRUM COMPRESSOR

**Marius G. Girodin, Paris, France, assignor to Techniques Girodin, Paris, France**

**Continuation-in-part of Ser. No. 962,608, Nov. 21, 1978, abandoned. This application Aug. 4, 1981, Ser. No. 289,892**
**Claims priority, application France, Nov. 30, 1977, 77 36022**
**Int. Cl.³ F04B *39/06, 3/00, 1/14***
**U.S. Cl. 417—243** **2 Claims**



1. A multistage drum compressor, comprising:

a drum having a longitudinal axis;

a plurality of piston and cylinder stages of different volume defined in said drum at angularly spaced locations in a first direction about said longitudinal axis, said stages defining an angular positional sequence about said longitudinal axis in which a first stage in the sequence has the largest volume of the stages, the last stage in the sequence has the smallest volume of the stages, and each stage in the sequence has a smaller volume than the preceding stage in the sequence;

a first plurality of flow passage means defined in said drum for conducting gas to be compressed to each of said stages sequentially in said angular positional sequence;

actuator means for sequentially actuating the pistons in said stages to compress gas therein in an order which is opposite to said angular positional sequence; and

a second plurality of flow passage means defined in said drum for conducting a coolant fluid in flow-isolated heat exchange relation with said first plurality of flow passage means;

wherein each of said first plurality of flow passage means each includes;

an outlet duct defined in said drum and extending from a

respective one of said stages in a direction generally perpendicular to said longitudinal axis;

a first longitudinal passage means defined in said drum extending parallel to said longitudinal axis and connected to said outlet duct to receive pressurized gas therefrom;

an intermediate duct defined in said drum, connected to said first longitudinal passage means to receive pressurized gas therefrom, and extending generally perpendicular to said longitudinal axis;

a second longitudinal passage means defined in said drum extending parallel to said longitudinal axis transversely spaced from said first longitudinal passage means, and connected to intermediate duct to receive pressurized gas therefrom; and

an inlet duct for the next stage in said sequence which follows said respective one of said stages, said inlet duct being defined in said drum and extending between said second longitudinal passage means and said next stage generally perpendicular to said longitudinal axis;

wherein said first and second longitudinal passages means conduct pressurized gas in opposite longitudinal directions within said drum.

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**4,516,914**

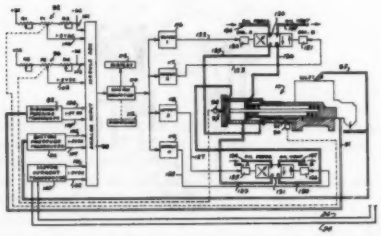
## MICRO-PROCESSOR CONTROL OF MOVEABLE SLIDE STOP AND A MOVEABLE SLIDE VALVE IN A HELICAL SCREW ROTARY COMPRESSOR

**David A. Murphy, Chambersburg, Pa., and Peter C. Spellar, Hagerstown, Md., assignors to Frick Company, Waynesboro, Pa.**

**Continuation of Ser. No. 416,768, Sep. 10, 1982, abandoned. This application Oct. 10, 1984, Ser. No. 659,038**

**Int. Cl.**[3] **F01C** *1/16;* **F04B** *49/06*

**U.S. Cl. 417—282** **10 Claims**



1. In a screw compressor having meshing helical rotors on parallel axes and mounted in a housing having intersecting cylindrical bores, a high pressure end wall at one end of said housing and a low pressure end wall at the other end thereof, the low pressure end wall having an inlet opening for the inlet of the compressor and the high pressure end wall having a discharge opening for the outlet of the compressor, an axially extending recess in the housing in open communication with said bores, a slide valve member mounted for axial movement in the recess, said slide valve member having an inner face in sealing relationship with said rotors, said slide valve member having a discharge face at one end thereof which is adjacent to the high pressure end wall and having a rear face at its other end, and a slide stop member mounted for axial movement in said recess, said slide stop member having an inner face in sealing relationship with said rotors, said slide stop member having a front face, the slide stop front face being adapted to engage the slide valve member rear face to form a continuous composite member which is selectively operative to close the axially extending recess to the inlet opening, said slide member and slide stop being movable apart to provide an opening therebetween of variable selected size and axial position in communication with the inlet opening, the improvement comprising first means sensing the pressure at the discharge opening, second means sensing the pressure at the inlet opening, third means sensing the position of said slide stop member, fourth means sensing the position of said slide valve member, and means responsive to said first, second, third and fourth sensing means for controlling the movement of said stop member and said slide valve member.

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**4,516,915**

## PUMPING PLANT

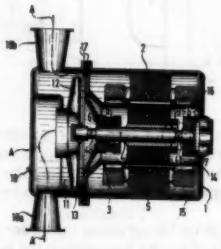
**N. Due Jensen, and K. Frank Nielsen, both of Bjerringbro, Denmark, assignors to Grundfos A/S, Bjerringbro, Denmark**

**Filed Mar. 10, 1983, Ser. No. 473,943**

**Claims priority, application Fed. Rep. of Germany, Mar. 24, 1982, 3210761**

**Int. Cl.**[3] **F04B** *17/00, 35/04;* **H02K** *5/132*

**U.S. Cl. 417—365** **1 Claim**



1. In a pumping plant for installations carrying water, comprising a split-tube motor and for driving a centrifugal pump and having an impeller which is located on the extremity of a shaft present in the pumping space, said shaft being borne by two radial anti-friction bearings located at either side of a stack of laminations of said rotor and said shaft consisting of ceramic material at least in the area of said anti-friction bearings and being longitudinally movable with respect to said ceramic bearing rings of the radial anti-friction bearings under forces acting axially on the impeller, the maximum length x of this longitudinal displacement being delimited by two axial anti-friction bearings, the invention which consists in that an annular groove is situated in each case right beside said two bearing areas of said two radial anti-friction bearings in said shaft, that is to say, in each case adjacent the extremity of said bearing areas directed towards the impeller, and that said length x is smaller than the width b of said radial anti-friction bearings and also smaller than the width l of said annular grooves, wherein the following relationship is obtained:

$$0.5 \leqq d/D \leqq 0.9$$

$$0.5 \leqq x/l \leqq 0.9$$

$$0.1 \leqq x/b \leqq 0.8$$

wherein,

d=diameter of the annular grooves, as measured along the bottom of the grooves,

D=diameter of the shaft in the area supporting the radial bearing,

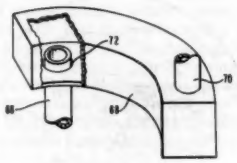
l=width of the annular grooves,

b=width of the bearing surface of the radial anti-friction bearings.

## 4,516,916
## OIL COOLED, HERMETIC REFRIGERANT COMPRESSOR

William A. English, and Robert R. Young, both of Murrysville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 9, 1982, Ser. No. 447,927
Int. Cl.³ F04B *39/06;* F25B *43/02*
U.S. Cl. 417—368 3 Claims




1. An oil cooled, hermetic refrigerant compressor of the vertical crankshaft type, comprising:

a hermetic shell with an oil sump in the bottom thereof;

a motor-compressor assembly therein including an upper electric motor having an inner rotor and an outer stator having end turns, and a lower compressor crankcase having its lower end immersed in said pump;

means providing a confined space at the top of said motor;

means for pumping oil from said sump to oil cooling means external of said shell and returning the cooled oil to said confined space for discharge against the top of said rotor;

means for channeling at least the major portion of said oil delivered to said confined space along the exterior of said stator;

passage means in said rotor for flowing oil delivered to said confined space down through said rotor to cool said rotor;

an annular space at the bottom of said motor to receive said remainder of oil, said annular space having outlet means at its periphery to flow oil down along the exterior of said crankcase;

means for delivering suction gas with any oil entrained therein into said shell;

means for separating at least a part of said entrained oil from said suction gas and conveying said suction gas in a confined path to a suction plenum;

said confined space means comprises a cap encompassing the top of said motor; and

said oil channeling means comprises a multiplicity of openings spaced around the lower periphery of said cap.

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## 4,516,917
## WELL PUMPING APPARATUS AND METHOD

Carlos R. Canalizo, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Mar. 28, 1983, Ser. No. 479,458
Int. Cl.³ F04B *47/08;* E21B *17/046*
U.S. Cl. 417—390 14 Claims

1. A downhole well pump, comprising:

a. downhole pump means installable in a well flow conductor for pumping production fluids to the surface, said pump means being operable by pressurized power fluid conducted thereto from the surface through a power fluid conduit connectable to said pump means, said pump means having a fishing neck at its upper end providing a downwardly facing shoulder; and

b. connecting means connectable between said power fluid conduit and said pump means, said connecting means including:

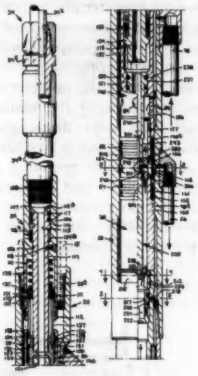
i. a latch housing having a bore therethrough, said latch housing being connectable to a power fluid conduit and having a lateral breather port through its wall;

ii. a latch mandrel having a bore therethrough, said latch mandrel having its upper portion slidably mounted in said bore of said latch housing and having expander means thereon;

iii. frangible means releasably holding said latch mandrel in position in said latch housing;

iv. collect means slidably mounted about said latch mandrel and having collet fingers thereon each having an upwardly facing shoulder engageable with said downwardly facing shoulder of said pump means, said collet means being slidable longitudinally on said latch mandrel between engaged and disengaged positions;

v. means biasing said collet means longitudinally of said latch mandrel toward engaged position; and



vi. means sealing between said latch mandrel and said latch housing above said lateral breather port and between said latch mandrel and said housing of said well pump, said connecting means being releasable from said pump means remotely by causing said latch mandrel to shear said frangible means and move longitudinally of said latch housing and said collet means to move said holding means of said latch mandrel to a position to release said collet fingers from engagement with said downwardly facing shoulder of said pump means, whereby said power fluid conduit is removable from said well flow conductor independent of said downhole pump means.

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## 4,516,918
## PUMP ASSEMBLY

Gilbert H. Drutchas, Birmingham, and Phillip B. Spencer, Troy, both of Mich., assignors to TRW Inc., Cleveland, Ohio

Filed May 25, 1982, Ser. No. 381,702
Int. Cl.³ F04C *2/00, 15/02*
U.S. Cl. 418—15 13 Claims

1. A rotary pump assembly comprising

cam means for defining fluid inlet and outlet arcs disposed in a circular array,

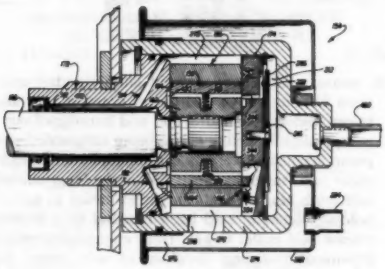
means cooperating with said cam means for defining a plurality of pumping chambers for holding liquid or liquid and air, said plurality of pumping chambers being sequentially movable along a circular path which extends along the inlet and outlet arcs, said means for defining a plurality of pumping chambers includes a rotor rotatable about its central axis and circumscribed by said cam means, a plurality of pumping elements mounted on and rotatable with said rotor and extending radially outwardly into engagement with said means, and first and second end members disposed adjacent to opposite axial ends of said rotor and cooperating with said cam means, pumping elements and rotor to at least partially define said pumping chambers,

inlet port means connected in fluid communication with said

inlet arc for directing liquid to each of said pumping chambers as it moves along said inlet arc,

an array of outlet ports extending along and connected in fluid communication with the outlet arc for conducting fluid flow from each of said pumping chambers as it moves along the outlet arc, said outlet ports being disposed in said first end member, and

flow control means for maintaining the rate of flow of liquid from said pump assembly substantially constant at a predetermined flow rate at pump operating speeds above a predetermined speed by reducing the volume of liquid discharged from each of said pumping chambers as it moves along the outlet arc as pump operating speed increases above the predetermined speed, said flow control means including (a) orifice means for limiting the rate of flow of liquid into said pump assembly to the predetermined flow rate as the operating speed of said pump assembly increases above the predetermined speed and (b) valve means for reducing the number of outlet ports through which fluid flow is discharged from each of said pumping chambers as pump operating speed increases above the predetermined operating speed by blocking fluid flow from each of said pumping chambers during pumping chamber movement along the outlet arc through an arcuate distance which increases as the operating speed of said pump assembly increases, said valve means including a plurality of elongated spring fingers each of which is mounted on said first end member and has a fixed end portion and a free end portion movable from a closed condition blocking fluid flow through one of the outlet ports to an open condition under the influence of fluid pressure in one of said pumping chambers,



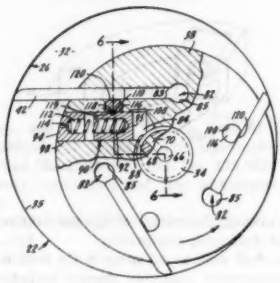
said rotor having an outer circumferential surface which is spaced from an initial end portion of said outlet arc by a first radial distance and which is spaced from a final end portion of said outlet arc by a second radial distance which is smaller than said first distance, said pumping elements being movable radially inwardly toward the central axis of said rotor under the influence of forces applied against said pumping elements by said cam means as the pumping chambers move along the outlet arc, said outlet ports including a plurality of recesses disposed in one of said end members and having radial extents which decrease along the outlet arc from a recess which is disposed adjacent to the initial end portion of the outlet arc and has a relatively large radial extent to a recess which is disposed adjacent to the final end of the outlet arc and has a relatively small radial extent to provide a generally constant spatial relationship between radially outer edge portions of the recess and the pumping elements as the pumping elements move along the outlet arc and move inwardly toward the central axis of said rotor.

**4,516,919**

## CAPACITY CONTROL OF ROTARY VANE APPARATUS

**Richard W. Roberts, Lombard, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed Jun. 30, 1983, Ser. No. 509,834**
**Int. Cl.³ F04C *18/00, 29/10***
**U.S. Cl. 418—23** **12 Claims**



1. A capacity control arrangement for a rotary vane fluid displacement apparatus which apparatus includes a housing having a reference axis, at least one endplate affixed to said housing to define therewith a compression chamber having an internal wall, a source of hydraulic control fluid at a pressure, a shaft extending through said housing and having an axis parallel to the reference axis, said shaft defining an outer wall and a blind-hole bore communicating with said source of fluid at a pressure, said shaft further defining a crossdrilled passage communicating between said blind-hole bore and said outer wall, a rotor mounted on said shaft in said compression chamber, said rotor defining a front face, a rear face and a plurality of longitudinal guide slits, each slit having side walls and a root in proximity to said shaft, a plurality of slidable vanes respectively disposed in said guide slits, each vane being operable between an extended working position and a retracted non-working position, an inlet port and a discharge valve connected to provide ingress to and egress from said compression chamber for a compressible fluid, a control means, and means for selectively communicating a hydraulic control fluid through said blind-hole bore in response to said control means,

a retaining means positioned in said rotor for each of said vanes to normally engage and maintain said vanes in said retracted non-working position;

wherein said fluid displacement apparatus includes said shaft defining a fluid communication passage open to fluid communication from said source of fluid at a pressure through said cross-drilled passage and said rotor defines a plurality of lateral passages, each lateral passage communicating between said fluid communication passage and one of said retaining means to communicate fluid above a predetermined pressure to disengage said retaining means from said vanes.

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**4,516,920**

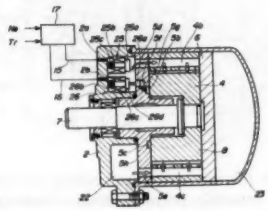
## VARIABLE CAPACITY VANE COMPRESSOR CAPABLE OF CONTROLLING BACK PRESSURE ACTING UPON VANES

**Tsunenori Shibuya, Konan, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Mar. 30, 1984, Ser. No. 596,001**
**Claims priority, application Japan, Apr. 6, 1983, 58-60566**
**Int. Cl.³ F01C *21/16***
**U.S. Cl. 418—23** **6 Claims**

1. A variable capacity vane compressor comprising: a cylinder having an endless camming inner peripheral surface; a pair of side blocks secured to opposite ends of said cylinder and

cooperating with said cylinder to define a pump housing, said pump housing having at least two pump inlets and at least two pump outlets; a rotor rotatably received within said pump housing and having an outer peripheral surface thereof formed therein with a plurality of slits each having a radially inner end, said rotor cooperating with said pump housing to define therebetween at least two cavities, said pump inlets and said pump outlets opening in different ones of said cavities; a plurality of back pressure chambers formed in said rotor and communicating with said radially inner ends of respective ones of said slits; a plurality of vanes radially slidably fitted in said slits for sliding contact with said endless camming inner peripheral surface of said cylinder; a suction chamber; first valve means for selectively establishing and interrupting communication between at least one of said pump inlets and said suction chamber; at least two passage means formed in at least one of said side blocks at locations corresponding to different ones of said cavities and separated from each other, for supplying said back



pressure chambers with compressed fluid as back pressure from respective ones of said cavities; at least one communication means formed in said at least one of said side blocks for communicating at least one of said passage means corresponding to said at least one of said pump inlets with said suction chamber; second valve means for selectively establishing and interrupting communication between said at least one of said passage means and said suction chamber by way of said communication means; and control means for controlling said first valve means and said second valve means, said control means being adapted to cause said first valve means to interrupt the communication between said at least one of said pump inlets and said suction chamber, and at the same time cause said second valve means to establish communication between said at least one of said passage means and said suction chamber by way of said communication means, thereby reducing the pressure of said compressed fluid supplied to said back pressure chambers by way of said at least one of said passage means.

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**4,516,921**

## END SEALS FOR A ROTARY MACHINE

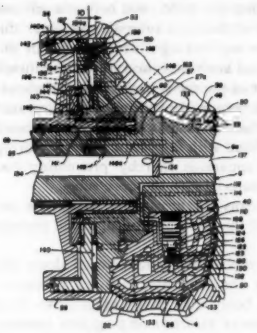
**Gail W. Kemp, Dallas, Tex., assignor to Vida M. Kemp, Dallas; Phyllis J. Carter, Richardson; Ruth E. Kemp, Dallas and Allan E. Kemp, Dallas, all of, Tex.**

**Continuation of Ser. No. 203,966, Nov. 4, 1980, abandoned, which is a division of Ser. No. 857,208, Dec. 5, 1977, Pat. No. 4,239,469, which is a continuation-in-part of Ser. No. 779,172, Mar. 18, 1977, abandoned, which is a continuation-in-part of Ser. No. 544,427, Jan. 27, 1975, Pat. No. 4,013,046. This application Mar. 21, 1984, Ser. No. 591,883**

**Int. Cl.³ F01C** *19/00*

**U.S. Cl. 418—141** **4 Claims**

1. In a rotary machine: a rotor; a housing having a working space formed therein, said rotor being disposed in said working space; a shaft extending through said housing and rigidly secured to said rotor, said shaft being rotably supported by said housing; seal means on at least one end of said rotor, said seal means being formed by two facing members separated by a plurality of circular fins formed on at least one of the facing members and arranged with the ends of said fins formed on at least one facing member engaging the other facing member, the first facing member being formed on the end of the rotor, and the second facing member being non-rotatably but moveably secured and sealed to said housing; means on one of said facing members to rake the space between fins formed on the opposite facing member to dislodge foreign matter, said raking means consisting of a plurality of relatively short length cir-



cumferential teeth, each tooth formed in substantially the shape of the space between adjacent fins on the opposite facing member; and means to circulate flushing lubricant fluid adjacent to the leading end of said teeth to flush out collected loose foreign matter; and a thrust control means to position said facing members in sealing relation.

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**4,516,922**

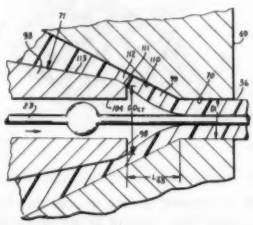
## HYBRID APPARATUS FOR INSULATING CONDUCTORS

**William M. Kanotz, Baldwin, Md., assignor to AT&T Technologies, Inc., Berkeley Heights, N.J.**

**Division of Ser. No. 306,820, Sep. 29, 1981, Pat. No. 4,425,292. This application Oct. 3, 1983, Ser. No. 538,706**

**Int. Cl.³ B29F** *3/10*

**U.S. Cl. 425—113** **5 Claims**



1. An apparatus for extruding a plastic material about a substrate, said apparatus including:

an extrusion crosshead;

a die being mounted in said extrusion crosshead and having an exit orifice which communicates through a land thereof with a cavity of said die;

a core tube having a passageway which has a cross-sectional size that is substantially greater than that of the substrate so that it is capable of passing irregularities in the substrate and which is mounted in said cavity of said die to align said passageway with said exit orifice of said die and to form a first portion of a flow passage between an outer surface of said core tube and a wall of said die cavity which converges toward a free end of said core tube, and wherein said free end of said core tube is beveled to form a surface which is parallel to a wall which defines said die cavity with said free end of said core tube having a circu-

lar cross section and being spaced a distance from an entrance of said land to form a second portion of the flow passage having a predetermined configuration and extending from a restriction formed at the end of the first portion of the flow passage to the entrance of the land of the die, the distance being such that a ratio having a numerator comprising the difference between an outer diameter of the end of the core tube and an outer dimension of the substrate and having a denominator of the distance is at least 1 and such that the ratio of the distance to an inner diameter of the die is in the range of about 0.5 to 1.3, and the predetermined configuration being such that the second portion of the flow passage becomes less than completely filled with the plastic material during the operation of said apparatus thereby preventing backflow of the plastic material into the core tube;

moving means for advancing successive increments of a length of the substrate through said passageway and said die; and

means for moving a plastic material along said flow passage to cover the substrate with the pressure in the plastic material being maximized as it flows through the minimum area of said converging first portion of said flow passage at said free end of said core tube and with the configuration of the second portion of the flow passage controlling the expansion of the plastic material occurring between said free end of said core tube and said land of said die to prevent the plastic material from filling completely the second portion.

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**4,516,923**

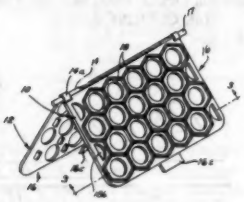
## FOOD PRESS FORMS

**Igor Lifshitz, and Ifim Lifshitz, both of 1635 N. Martel Ave., #316, Los Angeles, Calif. 90046**

**Filed Mar. 29, 1984, Ser. No. 594,740**

**Int. Cl.³ B29C *1/00*; A21C *5/00, 9/05, 11/10***

**U.S. Cl. 425—289** **4 Claims**



1. A food processing device in combination, comprising:

a. a first planar tray, having upper and bottom surfaces and surrounding edge portions;

b. a second planar tray, having upper and bottom surfaces and surrounding edge portions each of said trays having a plurality of rows of separate food product molding apertures, arranged therein staggered relative to one another;

c. hinging means mounted along and between facing edge portions of the trays, so that said trays, when joined, can swing from an aligned to a superposed position;

d. a plurality of rows of multiple elongated feet members projecting integrally from the bottom surface of each tray, at least one of each of said feet members being positioned adjacent to and in alignment with one of said molding apertures, so that at least one of said feet members of one tray, being, respectively, sized and arranged to cooperate with and intrude into one of said molding apertures of the other tray, will, when the trays are being inwardly swung from an aligned into a superposed position, eject the molded food products therefrom.

**4,516,924**

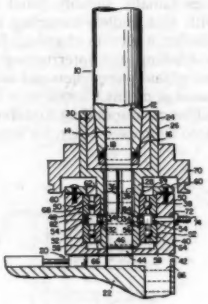
## RETAINING MEANS FOR DEVICE FOR CENTRIFUGALLY CASTING SYMMETRICAL OR ASYMMETRICAL ARTICLES

**David L. Rawlings, Bayville, N.Y., assignor to International Hydron Corporation, New York, N.Y.**

**Filed May 4, 1983, Ser. No. 491,159**

**Int. Cl.³ B29C *5/04*; B29J *1/00***

**U.S. Cl. 425—434** **11 Claims**



1. A device for the centrifugal casting of contact lenses comprising a rotatable polymerization column adapted for receiving in vertical series and in free falling arrangement a plurality of molds containing a polymerizable or curable composition, said column having an inlet for receiving said molds and an outlet for discharging said molds, means for rotating said column at a desired rate of speed, gas means for introducing gas up said column and retaining means disposed in the lower end of said column for retaining a lower mold in said column for a desired length of time, said retaining means being adapted to hold said mold for synchronous rotation with said column and to impart said synchronous rotation to said other vertically arranged molds and to release said lower mold during rotation of said column under the influence of pressure directed from said other vertically arranged molds.

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**4,516,925**

## PELLETIZING DIE FOR SYNTHETIC RESIN EXTRUDING MACHINE

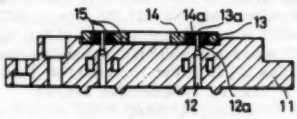
**Daijiro Fujita; Akihiko Motoo, and Yoshiki Maki, all of Hiroshima, Japan, assignors to The Japan Steel Works, Ltd., Tokyo, Japan**

**Filed Dec. 12, 1983, Ser. No. 560,307**

**Claims priority, application Japan, Dec. 10, 1982, 57-186008[U]**

**Int. Cl.³ A01J *21/00***

**U.S. Cl. 425—463** **6 Claims**




1. A pellitizing die for a synthetic resin extruding machine, said die comprising:

a die body having a nozzle with a predetermined diameter through which melted synthetic resin is to be extruded;

a tip having end surface portions and an outer surface portion of a predetermined shape and predetermined maximum dimensions, and having a centrally located hole of said predetermined diameter; and

a tip pressing plate having an aperture formed to surround

said outer surface portion of said tip and having dimensions at an outwardly facing end thereof which are smaller than said maximum dimensions of said tip, for securing said tip against said die body.

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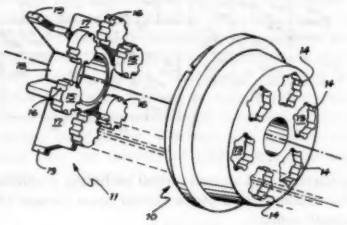
**4,516,926**

## EXTRUSION DIES

**Shu W. Yip, Hong Kong, Hong Kong, assignor to Breville Holdings Pty. Limited, New South Wales, Australia**

**Filed Jul. 13, 1983, Ser. No. 513,252**
**Claims priority, application Australia, Jul. 26, 1982, PF5048**
**Int. Cl.³ B29F *3/04;* A21C *3/04***
**U.S. Cl. 425—464** **5 Claims**



1. A two-part extrusion die comprising:

a first member having a substantially flat annular die plate portion, a central annular portion extending perpendicularly from said die plate portion having a central bore extending axially therethrough and extending axially through said die plate portion, a plurality of apertures through said die plate portion circumferentially spaced about said central bore and having axially extending walls, and a plurality of axially extending grooves in said walls; and

a second member having an annular sleeve portion for slidably accommodating said central annular portion of said first member having a bore extending coaxially with said central bore in said first member, radially extending arms extending outwardly from said annular sleeve portion, a plurality of core members attached to said arms corresponding to said apertures through said die plate portion and insertable into said apertures, and a plurality of axially extending grooves in the periphery of each core member for mating with said grooves in said walls of said apertures in said die plate to form extrusion openings arranged in a plurality of discrete groups spaced around said central bore.

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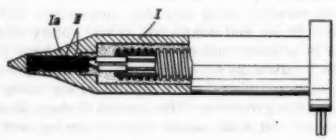
**4,516,927**

## POINTED HEAT-GENERATING DEVICE FOR MOLDS OF INJECTION MOLDING MACHINES

**Yoshiichi Yoshida, Yonezawa, Japan, assignor to Shigeru Tsutsume and Seiki Engineering & Research Co. Ltd., both of Yonezawa, Japan**

**Filed Jun. 19, 1981, Ser. No. 275,230**
**Claims priority, application Japan, Jun. 25, 1980, 55-88001[U]**
**Int. Cl.³ B29F *1/03***
**U.S. Cl. 425—549** **5 Claims**



1. An improved pointed heat-generating device for molds of injection molding machines comprising a metal casing, a pointed projectile heat-generating means fixed with an end of the metal casing, a gate formed at the pointed heat-generating means and communicated to a cavity of the molds, and a synthetic resin material being fused or cooled or solidified at the gate by an electric ON-OFF switching of the pointed heat-generating means, thereby the gate being opened or closed intermittently, wherein the improvement comprises an alloy portion formed by fusing of an end of a heat-generating wire penetrated wholly into a passage which is bored in a non-processed cylindrical material, with the non-processed cylindrical material, and thereby the alloy portion can be shaped as a pointed part of the heat generating means by machining.

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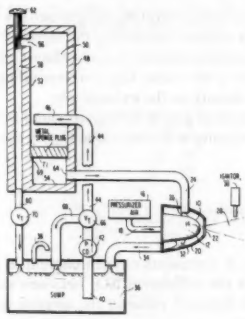
**4,516,928**

## FLOW CONTROL MODULE AND METHOD FOR LIQUID FUEL BURNERS AND LIQUID ATOMIZERS

**Robert S. Babington, McLean, Va., assignor to Owens-Illinois, Toledo, Ohio**

**Filed Mar. 17, 1983, Ser. No. 476,455**
**Int. Cl.³ F23H *1/00***
**U.S. Cl. 431—12** **35 Claims**



1. Apparatus for controlling the flow of liquid to a liquid atomizer comprising:

a source of liquid;

an enclosed volume adapted to be positioned above the liquid atomizer;

first conduit means for delivering a first flow of liquid from said source into said enclosed volume at a position for enhancing separation of entrained gases from said liquid;

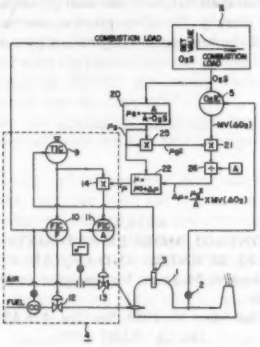
second conduit means for receiving a second flow of liquid, not exceeding the magnitude of said first flow, from said enclosed volume at a location near the lower end thereof and for feeding said second flow to the liquid atomizer, said second conduit means being open to ambient pressure at the location of the liquid atomizer for draining said enclosed volume through said second conduit means when said first flow ceases and for permitting the initial flow of liquid through said second conduit means to flush air therefrom, after which said second flow increases as said enclosed volume fills; and

means for sucking a third flow of liquid from said enclosed volume at a location near the upper end thereof when the level of liquid in said enclosed volume reaches said means for sucking, at which time said third flow commences and reduces said second flow.

## 4,516,929
## METHOD FOR CONTROLLING OXYGEN DENSITY IN COMBUSTION EXHAUST GAS

**Kazuo Hiroi, Hachioji, and Kenji Kojima, Kunitachi, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 15, 1984, Ser. No. 610,587**
**Claims priority, application Japan, May 16, 1983, 58-85432**
**Int. Cl.³ F23N *1/00, 5/00***
**U.S. Cl. 431—12** **3 Claims**



1. A method for controlling oxygen density in exhaust gas of a combustion system comprising the steps of:

detecting oxygen density in said exhaust gas;

finding out a set value $O_{2s}$ corresponding to the desired oxygen density in the exhaust gas;

calculating an air excess ratio $\mu_s$ required for maintaining the oxygen density at the set value $O_{2s}$ by the following equation,

$$\mu_s = \frac{A}{A - O_{2s}}$$

wherein A represents oxygen content in air;

finding out the difference $\Delta O_2$ between said set value $O_{2s}$ and said detected value of the oxygen density in the exhaust gas;

calculating a corrected value $\mu$ of said air excess ratio $\mu_s$, that is corrected against a control output $MV(\Delta O_2)$ corresponding to said difference $\Delta O_2$, according to the following equation,

$$\mu = \mu_s + \frac{\mu_s^2}{A} \times MV(\Delta O_2);$$

and

controlling air-fuel mixing ratio of said combustion system according to said corrected value so that the oxygen density in the exhaust gas is held to be equal to said set value $O_{2s}$.

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## 4,516,930
## APPARATUS AND METHOD FOR CONTROLLING A MAIN FUEL VALVE IN A STANDING PILOT BURNER SYSTEM

**Gerald E. Dietz, Goshen, Ind., assignor to Johnson Service Company, Milwaukee, Wis.**

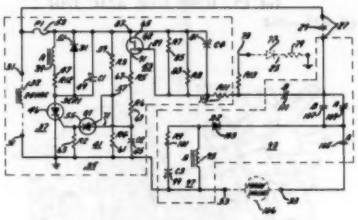
**Filed Sep. 30, 1982, Ser. No. 431,341**
**Int. Cl.³ F23Q *23/00***
**U.S. Cl. 431—26** **9 Claims**

1. An apparatus for repetitively verifying the integrity of a main fuel valve control circuit in a standing pilot burner system comprising:

a probe circuit for providing an electrical signal representative of the presence of a standing pilot flame;

a first circuit including a controllably gated transistor for receiving said electrical signal and responsively energizing a gating network, thereby energizing a first relay prior to the occurrence of a heat demand signal;

a second circuit adapted to be connected to a thermostat contact, said contact providing a heat demand signal to



said apparatus, said second circuit including a conductive path for disabling said probe circuit upon closure of said thermostat contact;

said first circuit responsively de-energizing said gating network and said first relay upon said disabling of said probe circuit;

said second circuit energizing a second relay in response to said first relay de-energization, thereby sequentially re-enabling said probe circuit and re-energizing said first relay to actuate a main fuel valve.

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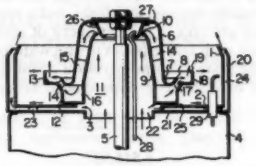
## 4,516,931
## FUEL GASIFYING BURNER

**Kingo Miyahara, Tokyo, Japan, assignor to Dowa Co., Ltd., Tokyo, Japan**

**Filed Nov. 21, 1983, Ser. No. 553,929**
**Claims priority, application Japan, Nov. 25, 1982, 57-206778**
**Int. Cl.³ F23D *11/04***
**U.S. Cl. 431—168** **6 Claims**



1. A fuel gasifying burner comprising:

a combustion cylinder open at one end and closed at the other end, said other end being formed substantially at its central portion with an air supply port;

a rotary shaft extending through said air supply port into said combustion cylinder;

a frustoconical rotary gasifying member closed at its forward end and open at its base, said frustoconical rotary gasifying member being rotatably mounted in said combustion cylinder and connected to said rotary shaft and formed at a lower end of its wall with a bent portion extending outwardly from said lower end of said wall and having at its peripheral end a liquid fuel scattering end;

an inner gasifying member of frustoconical shape formed at its forward end with an air supply opening and in its interior with an air passage maintained in communication through said air supply port with an air blowing chamber connected to a base of said inner gasifying member, said

inner gasifying member being located inside said frustoconical rotary gasifying member and connected thereto to form a unit therewith and having connected to a lower end of its wall a fuel-air mixture gas diffusing wall extending outwardly a greater distance than said bent portion at said lower end of said wall of said frustoconical rotary gasifying member;

a fuel-air mixture passage, a gas chamber and a gas ejecting passageway defined between an inner wall surface of said frustoconical rotary gasifying member and an outer wall surface of said inner gasifying member and arranged in the indicated order from said forward end of said frustoconical rotary gasifying member toward said base of said inner gasifying member; and

an annular flame ejecting upright wall contiguous with said fuel-air mixture gas diffusing wall connected to the lower end of the wall of the inner gasifying member and formed at its forward end with a liquid fuel rescattering end, said flame ejecting upright wall being operative when said mixture impinges thereon to reduce the pressure under which said fuel-air mixture gas is ejected through said gas ejecting passageway, whereby said mixture can be diffused into the interior of said combustion cylinder in flames of reduced vigor.

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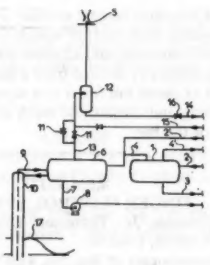
**4,516,932**

## SAFETY SYSTEM INTENDED IN PARTICULAR TO ELMINATE ENTRAINED OR CONDENSED LIQUIDS, AND TO LIMIT THE HEAT RADIATION WHEN FLARING OR DISPERSING HYDROCARBON GASES

**Gérard Chaudot, Andresy, France, assignor to Cabinet Brot, Paris, France**

**Filed Apr. 29, 1983, Ser. No. 489,857**
**Claims priority, application France, Jun. 5, 1982, 82 07917**
**Int. Cl.³ F23D *13/20***
**U.S. Cl. 431—202** **12 Claims**



12. A safety system to eliminate liquids, as well as to limit the heat radiation and the intensity of noises received, during the discharge of gases from an installation handling flammable fluids characterized in that the system introduces, in the flow chain of the gas (4) between a potential source of liquid and a vent to the atmosphere, a flare base flask connected at its upper part to a flare stack (13), characterized in that the flare stack comprises:

a back pressure device (11) to maintain the velocity of flow of the gas inside the flare stack relatively high; and

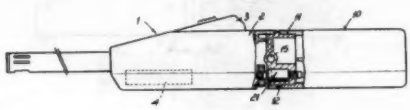
a venting orifice (5) equipped with means to pulverize into a mist any drops of liquid remaining in the gas flow and to quickly assure an intimiate mixture of the gas with the ambient air in order to obtain rapid and complete combustion and thereby avoid the condensation and fallout of the liquid drops in the vacinity thereof, as well as a short flame with little radiation.

**4,516,933**

## HOUSEHOLD LIGHTER

**Enrico Buzzi, Via Europa 120, Concesio (Province of Brescia), Italy**

**Filed May 21, 1984, Ser. No. 612,232**
**Claims priority, application Italy, Nov. 11, 1983, 23530/83[U]**
**Int. Cl.³ F23Q *7/12***
**U.S. Cl. 431—255** **6 Claims**



1. A household lighter comprising an outer housing containing a spark generating cartridge for operation by a pushbutton barely protruding from said housing, characterized in that it comprises a liquefied gas supply reservoir forming a handle for the lighter and being closed at one end by a small block constituting a connective element to said outer housing.

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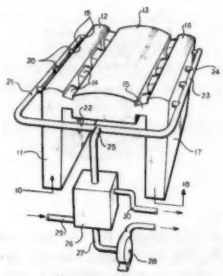
**4,516,934**

## WASTE HEAT RECOVERY FROM REGENERATIVE FURNACES

**Frederick J. Nelson, Swanton, and Ray S. Richards, Sylvania, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Nov. 25, 1983, Ser. No. 555,249**
**Int. Cl.³ F24H *7/00*; F27D *17/00***
**U.S. Cl. 432—30** **7 Claims**



1. A method of extracting clean hot gases from a reversing regenerative furnace having a pair of regenerators for preheating combustion air on the inlet side and extracting waste gas heat on the exhaust side, comprising the steps of providing a duct extending between the upper air inlet side and upper exhaust outlet side of the furnace regenerators, tapping the duct intermediate its length and passing the tapped air in the duct to a heat-utilizing system to recover the heat from said air.

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**4,516,935**

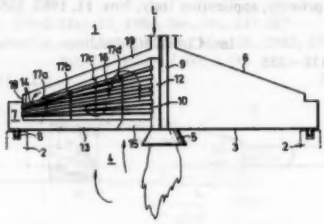
## ARRANGEMENT FOR HEATING AND/OR HEAT RETAINING OF CONTAINERS

**Gerhard Sanders, Silberstr. 1, 7570 Baden-Baden, Fed. Rep. of Germany**

**Filed Jul. 25, 1983, Ser. No. 517,358**
**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1982, 3227504**
**Int. Cl.³ F27D *1/00***
**U.S. Cl. 432—247** **24 Claims**

1. Arrangement for heating and/or heat retaining of containers and their contents, for example ladles to be filled with molten metal, the arrangement comprising a burner arranged

to be directed into the interior of the container; a cover for covering a container opening; and a preheating device for preheating a combustion air, said preheating device being formed as a component of said cover wherein said cover has a



wall which faces toward the interior of the container and limits a combustion chamber, said wall being at least partially a component of at least one cooling passage for supplying substantially cold combustion air.

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**4,516,936**

**ORTHODONTIC DEVICE**

**Jan H. Hulsink, Zuylensteinseweg 19, 3958 BA Amerongen, Netherlands**

**Filed May 13, 1983, Ser. No. 494,180**

**Claims priority, application Netherlands, Mar. 4, 1983, 8300810**

**Int. Cl.³ A61C *3/00***

**U.S. Cl. 433—6** **7 Claims**

6. An orthodontic device for the jaw comprising, a plastic dental plate adapted to be fitted to the jaw and the lingual surfaces of the teeth to apply moving forces to the teeth, wire clamp means extending from the sides of said plate for engagement with the posterior teeth, anchoring means at the front of said plate adapted to grippingly fit about the front and rear surfaces of a plurality of anterior teeth, said anchoring means being formed completely from plastic and being shaped to complementally fit closely against substantially the entire front and rear surfaces of said anterior teeth and to have an opening through which at least the cutting faces of the central incisors may freely project.

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**4,516,937**

**SYSTEM FOR DENTURE SUPPORT USING A TRANSMANDIBULAR IMPLANT**

**Hans Bosker, Essen 14, 9751 NC Haren, Netherlands**

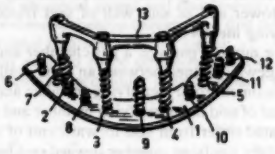
**Filed Nov. 30, 1983, Ser. No. 556,520**

**Int. Cl.³ A61C *8/00***

**U.S. Cl. 433—173** **15 Claims**

1. An apparatus providing support on the lower jaw for a submaxillary denture characterized by a base plate comprising an arcuate metal strip having an intermediate portion, the centerline of which in plan view bring an arc across a subtending chord approximately 34 mm in length and with a height of approximately 8 to 10 mm; a bridging means comprising hooking means for coupling means included in a submaxillary denture;

a set of posts to stand on said intermediate portion for carrying said bridging means;



a fixing means for each of said posts to fix said bridging means; and a set of cortical screws to adjoin said base plate fixedly to the lower face of the lower jaw at locations on either side of each of said posts.

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**4,516,938**

**BONDABLE LINGUAL RETAINER**

**Arthur B. Hall, LaPorte, Ind., assignor to TP Laboratories, Inc., Westville, Ind.**

**Filed Jan. 31, 1984, Ser. No. 575,656**

**Int. Cl.³ A61C *5/00***

**U.S. Cl. 433—215** **11 Claims**

1. A dental bondable lingual retainer comprising, a plurality of spaced bonding pads each of which is bondable to a tooth, and a bar interconnecting said adjacent pads, said bonding pads and bar being integrally formed from a laminated sheet consisting of a layer of metal foil fused to a layer of metal mesh, and means for filling and closing the mesh of said bar to enhance the strength of the bar.

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**4,516,939**

**FINGER CONTROL SYSTEM**

**Arthur G. Crimmins, Jr., Tillamook, Oreg., assignor to Quill Licensing, Ottowa, Canada**

**Continuation-in-part of Ser. No. 42,077, May 24, 1979, abandoned. This application Apr. 21, 1982, Ser. No. 370,195**

**Int. Cl.³ G09B *21/00***

**U.S. Cl. 434—114** **10 Claims**

1. An apparatus for the generation of a binary code comprising:

(a) ten switches arranged in two groups of five and each group on handles adapted to the right and left hand of a human operator, each switch having a neutral mode and a depressed mode;

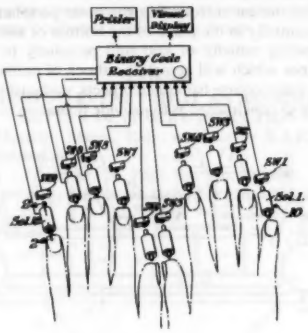
(b) drive means coupled to said switches whereby the switches may be moved from the neutral mode to the depressed mode;

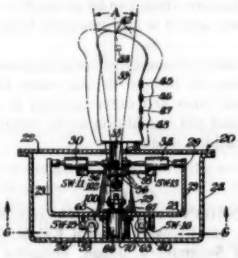
(c) a binary code receiver responsive to the two modes of the switches and to a signal generated when the human operator releases the fingers of his left and right hand from the two groups of five switches whereby the sequence of switches selected is transmitted to the binary code receiver and capable of operating the drive means;

(d) processor means connected to the binary code receiver and connected to equipment whereby the equipment re-

ceives and acts on commands transmitted by the binary code receiver; and

(e) feedback means connected to the binary code receiver and a teaching system means whereby a person is taught



how switch sequences generate commands which will operate equipment and corrections are indicated to the person by the drive means being activated by the binary code receiver.

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**4,516,940**

**PROPULSION UNIT FOR A WATER-BORNE VESSEL**

**Ernest F. Roberts, 164, Marine Parade, Leigh-on-Sea, Southend, Essex, England**

**Filed May 18, 1982, Ser. No. 379,450**

**Claims priority, application United Kingdom, May 19, 1981, 8115382**

**Int. Cl.³ B63H** *1/14, 23/06*

**U.S. Cl. 440—53** **8 Claims**

2. A propulsion unit for a water-borne vessel, the unit comprising:

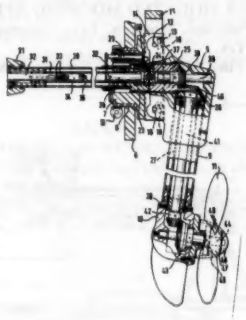
a drive transmission assembly comprising a generally horizontal input drive shaft for connection to an inboard engine and an input steering shaft;

a leg depending from the drive transmission assembly, the leg being mounted on the drive transmission assembly by mounting means comprising a substantially horizontal athwartships axis pivot connection, whereby the leg can be swung up about the pivot connection on striking an obstruction;

a propeller housing supported on the lower end portion of the leg for rotary movement generally about the axis of the leg, the propeller housing being rotatable through substantially more than 180° so as to enable the vessel to go astern without changing the direction of rotation of the input drive shaft;

steering transmission means connecting the propeller housing to said input steering shaft, for rotating the propeller housing to steer the vessel;

automatic locking means for locking the leg in its fully extended position when the propeller housing is rotated through at least 90° from its direct forward position, the automatic locking means comprising a cam associated with the steering shaft, a cam follower which follows the cam, and a locking member actuated by the cam follower to prevent the leg swinging up about the pivot connection;



a propeller rotatably mounted on the propeller housing; and

drive transmission means connecting the propeller to said input drive shaft, for driving the vessel, the drive transmission means comprising disengageable clutch means between the drive transmission assembly and the leg, and below the level of said pivot connection, whereby the disengagable clutch means is disengaged when the leg is swung up.

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**4,516,941**

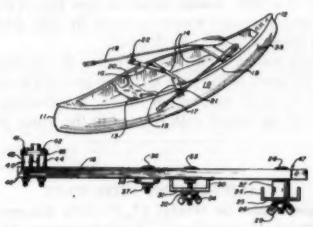
**ROWING OUTRIGGER**

**Norman C. Reid, 5417 Vera Cruz Ave. North, Crystal, Minn. 55429**

**Filed Oct. 14, 1983, Ser. No. 541,959**

**Int. Cl.³ B63H** *16/06*

**U.S. Cl. 440—105** **6 Claims**



1. A portable rowing outrigger for one side of a canoe comprising, in combination;

a flat substantially rectangular and elongated outrigger base having inboard and outboard ends and upper and lower major surfaces;

means for operatively receiving an oarlock disposed at the upper outboard end of said base;

means extending downwardly of the bottom of said base for resiliently, frictionally engaging at least one side of a thwart of a canoe at the inboard end; and

means extending downwardly of the bottom and disposed intermediate said inboard and outboard ends of said base for resiliently, frictionally engaging one side of the gunwale of a canoe and clampably engaging the other side and bottom of said gunwale whereby said elongated out-

rigger extends horizontally, angularly outwardly on the top of a canoe from a thwart, over said gunwale and said means for receiving said oarlock is disposed outwardly of the side of the canoe and said means for frictionally engaging said thwart and said gunwale are operable under propelling force applied to said oarlock to increase said frictional engagement with said thwart and said gunwale.

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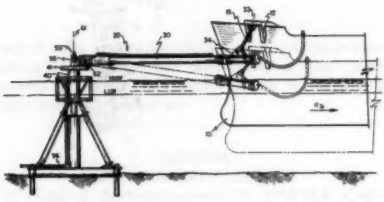
**4,516,942**

**TOWER MOUNTED MOORING APPARATUS**

**Kristen I. Pedersen, Houston, Tex., assignor to Sofec, Inc., Houston, Tex.**

**Filed Mar. 25, 1983, Ser. No. 478,837**
**Int. Cl.³ B63B *21/52***
**U.S. Cl. 441—5** **7 Claims**



1. Mooring apparatus for mooring and loading or discharging a tanker vessel in a body of water comprising,

a stationary tower fixed to the floor of the body of water, said tower fixed in a vertical position having a tower shaft extending above the surface of the water,

unitary yoke means having two arms forming a "V" shape, the closed end of the V shaped yoke means attached to the tower shaft by a triaxial articulation means disposed on said shaft above the surface of the water for allowing the yoke means to move in yaw, pitch and roll with respect to the tower,

yoke suspsension means for connecting the outer ends of the two arms of the yoke means to the vessel for maintaining the yoke means substantially above water under conditions of a fully loaded vessel at low low water, and for allowing the yoke means to move in yaw, pitch and roll with respect to the vessel, and

weighting means removably disposed in the outer ends of the two arms of the yoke means to provide in combination with the yoke suspension means, a self-acting restoring force to the vessel with respect to the tower means.

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**4,516,943**

**AMUSEMENT RIDE RAFT**

**Robert Spieldiener, Im Winkel 13, FL-9496 Balzers, Liechtenstein; Reinhold Spieldiener, Aussichtsstrasse 23, CH-8704 Herrliberg, and Alfons Saiko, Speerstrasse 26A, CH-8942 Oberrieden, all of Switzerland**

**Continuation-in-part of Ser. No. 274,639, Jun. 17, 1981, abandoned. This application Jun. 24, 1983, Ser. No. 507,993**
**Int. Cl.³ B63B *35/58***
**U.S. Cl. 441—35** **2 Claims**

1. A raft for carrying a plurality of raft riders on a rapid flow water course amusement ride having water course banks and objects disposed in said water course with which said raft is intended to collide and bounce off of, said raft comprising

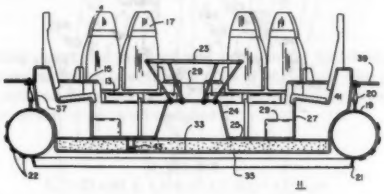
a generally circular shaped unitary raft hull formed by two mating inner and outer hull sections formed to provide a circular hull bottom and perimeter sides,

a multiplicity of pairs of inwardly facing, high-back seats substantially evenly distributed around the inner periphery of said hull,

an outer peripheral deck and a floor board area formed in said inner hull section,

entrance and exit steps formed in the inner hull section between said pairs of seats, said steps extending from said peripheral deck to said floor boards,

a cushion means surrounding the outer periphery of hull substantially in the plane of the bottom of said hull and extending radially of said hull periphery to act as a bumper which will absorb the shock of collisions with said water course banks and objects, said cushion means being so constructed as to provide floatation to said raft,



a hand-hold mount formed in the center of the inner hull section of said raft for a circular hand-hold secured to said hand-hold mount which can be grasped for balance by all the raft riders seated in said inwardly facing high backed seats, and

redundant safety floatation material disposed substantially throughout the bottom of said outer hull section between said inner and outer sections to provide buoyancy to said raft in addition to the buoyancy provided by said cushion means.

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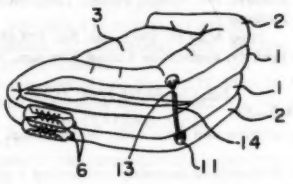
**4,516,944**

**EXPANSION TYPE LIFE-SAVING RAFT**

**Saito Hirobumi; Ito Kiyoshi; Higuchi Kaichi, and Yamamoto Masao, all of Sagamihara, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**PCT No. PCT/JP82/00459, § 371 Date Aug. 3, 1983, § 102(e) Date Aug. 3, 1983, PCT Pub. No. WO83/01933, PCT Pub. Date Jun. 9, 1983**
**PCT Filed Dec. 2, 1982, Ser. No. 531,832**
**Claims priority, application Japan, Dec. 3, 1981, 56-195072**
**Int. Cl.³ B63C *9/04***
**U.S. Cl. 441—40** **11 Claims**



1. A flexible, expansion type life-saving raft, comprising:

at least one annular gas chamber of ring shape;

at least one lower gas chamber fixedly secured to a bottom surface of said at least one annular gas chamber;

stanchion gas chambers provided on a top part of said annular gas chamber;

an awning which forms a roof part by being supported on said stanchion gas chambers and having an entrance formed therein, said life saving raft being folded and housed in a container when not in use, and being expanded by filling said at least one annular gas chamber, the at least one lower gas chamber and the stanchion gas chambers with gas at the time of its use, wherein at the time of

housing said raft in the container, said raft is folded with said awning being placed inside;

fitting means fixedly provided at opposite positions on an outer peripheral part of said at least one annular gas chamber in a folded mutual confrontation state; and

fastening means provided at least at one point between said opposite positions of said fitting means.

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**4,516,945**

## METHOD TO EVENLY HEAT AN ASYMMETRIC GETTER DEVICE BY INDUCTION

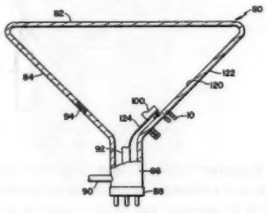
**Daniele Martelli, Milan, Italy, assignor to S.A.E.S. Getters S.p.A., Milan, Italy**

**Filed Apr. 26, 1983, Ser. No. 488,698**

**Claims priority, application Italy, Apr. 28, 1982, 20971 A/82**

**Int. Cl.³ H01J** *9/395*

**U.S. Cl. 445—19** **8 Claims**



1. A method for evaporating a getter metal from a getter device within a kinescope which getter device comprises a container holding the getter-metal releasing material, wherein the container has an outside wall having a high portion and a low portion, wherein the container has a central axis; said method comprising the steps of:

I. placing the getter device within the kinescope on the inside surface of the wall of the kinescope; and then

II. placing an induction coil comprising a major coil having an axis and a smaller minor coil wherein a portion of the major coil is substantially coincidental with a portion of the minor coil, and wherein a portion of the major coil is offset with respect to the minor coil; on the outside surface of the wall of the kinescope with the axis of the major coil substantially coincidental with the axis of the getter device and with the high portion of the outside wall of the getter device adjacent to that portion of the major coil which is coincidental with the minor coil; and then

III. passing an alternating radio-frequency current through the induction coil to heat the getter device and thereby evaporate the getter metal.

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**4,516,946**

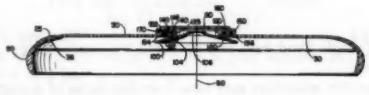
## AERODYNAMIC THROWING IMPLEMENT

**Michael R. Rodarte, 12371 Nutwood St., Garden Grove, Calif. 92640**

**Filed May 9, 1983, Ser. No. 493,031**

**Int. Cl.³ A63H** *27/00*

**U.S. Cl. 446—46** **12 Claims**



10. An improved aerodynamic shaped throwing implement, comprising:

a saucer-shaped hull member comprising a circular body member having a center axis and a rim extending around the periphery of the body member, said body member and rim being adapted to form an upper convex surface and a lower concave surface, the circular body member further comprising a central dome member centered about the center axis of the hull and defining a cavity on the concave side of the hull; and

a rotatable member coupled to said hull member by a bearing means comprising inner and outer journal members, said bearing member being received in said cavity, the rotatable member arranged to rotate freely with respect to the hull member and on an axis which substantially coincides with the axis about which the hull member rotates, said rotatable member having a surface disposed adjacent said concave surface of said hull member.

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**4,516,947**

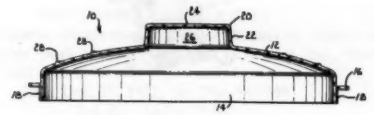
## DISCOIDAL AMUSEMENT DEVICE

**Donna S. Pircher, and Reinhold A. Pircher, both of 2701 Sioux, Independence, Mo. 64057**

**Filed Oct. 3, 1983, Ser. No. 538,091**

**Int. Cl.³ A63H** *27/00*

**U.S. Cl. 446—46** **5 Claims**



1. A discoidal toy comprising:

a discoidal body having a convex top side and a concave bottom side and presenting a generally circular periphery;

a cylindrical flange on the periphery of said body providing a hand grip to facilitate throwing and catching of the body, said flange having an outer surface and presenting a free edge and an opposite edge connected with said periphery of the body;

a planar fin projecting outwardly from said flange at a location thereon between said free and opposite edges, said fin being annular and having flat and parallel opposite surfaces and said fin occupying a substantially horizontal plane when said bottom side of the body faces downwardly in flight; and

a plurality of ribs on said flange for stabilizing said body in flight, each rib extending only below said fin and having a top end adjacent said fin and a bottom end adjacent said free edge of the flange, said ribs being spaced apart from one another substantially equidistantly on the outer surface of said flange and each rib having a generally vertical orientation when said concave side of the body faces downwardly in flight.

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**4,516,948**

## RECONFIGURABLE TOY ASSEMBLY

**Hiroyuki Obara, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan**

**Filed Feb. 28, 1984, Ser. No. 584,460**

**Claims priority, application Japan, Sep. 22, 1983, 58-146785[U]**

**Int. Cl.³ A63H** *17/00*

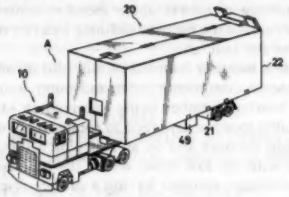
**U.S. Cl. 446—95** **11 Claims**

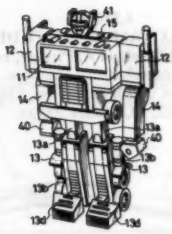
1. A reconfigurable toy assembly wherein a toy vehicle is reversibly reconfigured into a toy robotic humanoid and a play space, said assembly comprising:

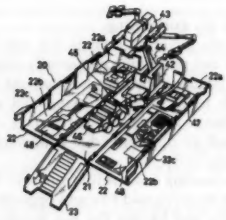
a tractive unit; and

a trailer section; said tractive unit and trailer section being separatably connected to each other and adapted to form said toy vehicle in the connected state, and said tractive unit being adapted to be foldable and pivotal at proper portions thereof so as to be reversibly reconfigured into

said toy robotic humanoid, while said trailer section being adapted to open and close at proper portions thereof and







having therein an unfoldable play space to be used for a play with said toy robotic humanoid.

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**4,516,949**

**SELF SEALING VALVE ASSEMBLY**

**Joel Schwartz, Brooklyn, N.N.Y., assignor to U.S. Balloon Mfg. Co., Inc., Brooklyn, N.Y.**

**Filed Feb. 19, 1982, Ser. No. 350,307**

**Int. Cl.³ A63H *3/06***

**U.S. Cl. 446—222** **19 Claims**

1. An inflatable assembly comprising:

A. A device having an inflatable body with a neck thereon, said neck terminating in a free end and having an opening extending from said free end and communicating with the interior of said body which is capable of being inflated;

B. a tube initially extending at least partially into said neck through said opening;

C. closure means including an adhesive element adhesively mounted externally on said neck and having a substantial, adhesive-coated area protruding beyond said free end, said closure means being adapted to be moved from an open condition in which said tube extends into said neck such that a gas entering said device through said tube inflates said body to a closed condition in which at least a portion of said coated area of said adhesive element which extends beyond said free end is sealed to another portion thereof when said tube is removed from said opening to seal said neck opening;

D. guide means extending intermediate a surface of said tube and a portion of said adhesive-coated area of said adhesive element, said guide means including surface means adapting it to be retracted from said closure means with the tube such that said adhesive element when compressed is

sealed together beyond said free end and said closure means is in its closed condition so as to obtain a sealing of said neck to prevent gas from escaping therethrough.

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**4,516,950**

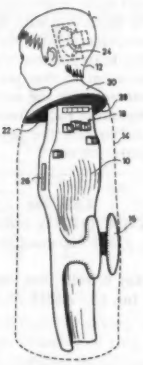
**SPEAKING TOY EMPLOYING CHORDIC INPUT**

**Oded Berman, Tel Aviv; Zohar Eilam, Ramat Aviv, and Zeev B. Itzchak, Haifa, all of Israel, assignors to Ergoplic Ltd., An Israel Company, Kiron, Israel**

**Filed Jan. 27, 1982, Ser. No. 343,373**

**Int. Cl.³ A63H *33/26***

**U.S. Cl. 446—297** **16 Claims**



1. A single hand held and operated toy comprising:

a base;

means for mounting said base onto the wrist of a user;

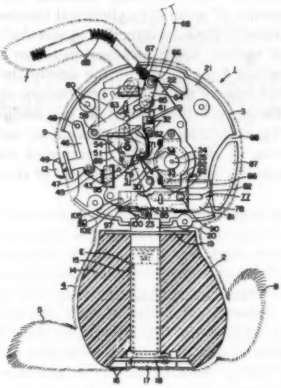
means for producing a desired sequence of sounds; and

chordic keyboard apparatus mounted onto said base and arranged to be operated by the fingers of the same hand of the user as the wrist onto which the base is mounted, said chordic keyboard apparatus being manually engageable in a selectable sequence for operating said producing means.

## 4,516,951
## MOVABLE TOY ANIMAL

Hiroshi Saigo, Kasukabe, and Hiroshi Kaneko, Tokyo, both of Japan, assignors to Iwaya Corporation, Tokyo, Japan

Filed Nov. 21, 1983, Ser. No. 553,848
Claims priority, application Japan, Nov. 29, 1982, 57-208972
Int. Cl.³ A63H *3/36*
U.S. Cl. 446—338 3 Claims



1. A movable toy animal comprising a toy body consisting of a trunk containing a battery case therein and made of a soft, elastic material, a head provided on said trunk and having a face with eyes and a nose thereon and ears attached to both side portions of said head, and a skin covering said trunk and said head and covered with hair; an electric motor set on a frame in said head and electrically connected to a battery in said battery case; gearing operatively connected to said electric motor; an axially-movable change-over gear meshed with a first output gear in said gearing and adapted to be engaged with and disengaged from a nose-driving gear, which is adapted to move said nose forward and backward and mounted fixedly on a crankshaft; a driving shaft having an input gear meshed with a second output gear in said gearing; a cam disc mounted fixedly on said driving shaft and having on its inner side surface a projection adated to urge a pressure-receiving portion of a slide shaft, on which said change-over gear is fixedly mounted; first and second cam plates of different shapes mounted fixedly on both end portions of said driving shaft and connected operatively to operating members, which are adapted to move said ears up and down; and a switch unit, which is provided in a rear portion of said head so as to constitute a part thereof, and which has a push element provided retractably and adapted to be pressed to actuate said electric motor.

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## 4,516,952
## PUSH-DOWN ACTUATED TOY

Derek A. Brand, Camarillo; Derek R. Brand, Carpinteria, and Kenneth J. Brand, Camarillo, all of Calif., assignors to Derek and Derek, Ventura, Calif.

Filed Apr. 22, 1982, Ser. No. 371,494
Int. Cl.³ A63H *17/14*
U.S. Cl. 446—427 3 Claims

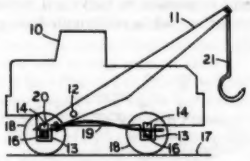
1. A toy vehicle supported on a play surface and having actuation of a part comprising:

(a) a rigid vehicle body;

(b) means for supporting the vehicle with respect to the play surface and allowing generally vertical movement between the vehicle body and said means for supporting the vehicle body;

(c) resilient means exerting a force between the support means and the vehicle body to hold the vehicle body upwardly with respect to the vehicle support means and having a strength that is overcome by manually pushing the vehicle body toward the play surface;

(d) an actuated part mounted on the vehicle body and moveable through a normal range and having a physical engagement with said means for supporting the vehicle,



whereby manually pressing the rigid vehicle body causes the means for supporting the vehicle to move with respect to the vehicle and simultaneously move the actuated part because of its engagement with the means for supporting the vehicle.

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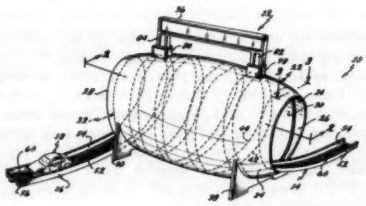
## 4,516,953
## TOY VEHICULAR PLAYSET

Keith A. Hippely, Manhattan Beach, and Samuel M. Goldstein, Los Angeles, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Dec. 27, 1983, Ser. No. 565,558
Int. Cl.³ A63H *18/00*
U.S. Cl. 446—444 6 Claims



1. In a toy vehicular playset, the combination comprising:

a transparent hollow member having an encompassing sidewall, a first open end and a second open end, said encompassing sidewall including an inner surface and an outer surface; and

a toy vehicular track formed integrally with said inner surface of said sidewall, said track spiraling from one of said open ends of said hollow member to the other end thereof, whereby toy vehicles may be guided along said inner surface of said sidewall from either one of said open ends to the other of said open ends.

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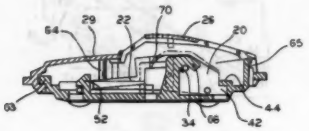
## 4,516,954
## TOY VEHICLE

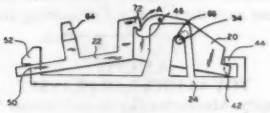
Kwong-Wai Chow, Kowloon; Alfred T. Y. Lau; Ming-Ngar Chow, both of Hong Kong, all of Hong Kong, and James S. W. Lee, 4528 42nd St. Apt. 4A, Long Island, N.Y. 11104, assignors to James S. Lee, Long Island, N.Y.

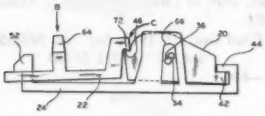
Filed Mar. 10, 1983, Ser. No. 473,991
Claims priority, application United Kingdom, Jan. 11, 1983, 8300589
Int. Cl.³ A63H *29/24*
U.S. Cl. 446—461 9 Claims

1. A toy vehicle having toggle-linkage means comprising a gear box containing a spring and a trigger lever arm, said gear box having a first end pivotally attached onto said vehicle at a particular point, said trigger lever arm having one end pivot-

ally attached to said vehicle at a different point which is remote from said particular point, a second end of said gear box engaging another end of said trigger lever arm, the relative lengths of said gear box and trigger lever arm being such that said toggle-linkage may move back and forth between two over center positions, said spring urging said toggle-linkage to one of said two over center positions when said spring is wound, means responsive to backward motion of said vehicle on a support surface while said toggle-linkage is in said one of







said positions for storing energy in said spring, and control means for applying a force to said toggle-linkage for moving said linkage to the other of said two over center positions, said gear box being coupled to drive said vehicle in a forward direction responsive to said toggle-linkage in said other over center position, whereby said gear box winds said spring responsive to a rotation of gears in said gear box in one direction and drives said vehicle on a support surface responsive to rotation of the gears in said gear box in an opposite direction with an unwinding of said spring.

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**4,516,955**

## INSTALLATION FOR DAMPING VIBRATIONS IN THE DRIVE TRAIN OF A MOTOR VEHICLE

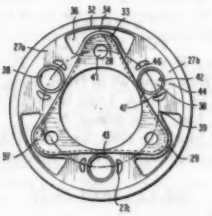
**Günter Wörner, Kernen; Franz Kosik, Ostfildern, and Hartmut Gösele, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Aug. 30, 1982, Ser. No. 413,150**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1981, 3134310**

**Int. Cl.³ F16F** *15/12, 15/14*

**U.S. Cl. 464—89** **11 Claims**



1. An installation for damping vibrations in the drive connection of a motor vehicle comprising a vibration absorber in coaxial arrangement with a shaft of the drive connection, the vibration absorber including an annular mass, a carrier flange adapted to be secured to said shaft, and resilient body means of an elastomeric material for connecting the carrier flange with the annular mass and effecting the vibration-coupling of the annular mass with the shaft, stiffening elements in said resilient body means for influencing in a defined manner the frequencies of the natural vibrations of the vibration absorber by the arrangement thereof within the resilient body means and the configuration thereof, the stiffening elements being constructed as a plurality of generally cylindrical sleeves extending generally parallel to the axial direction of said shaft, each of said plurality of sleeves being arranged between an outer bridge of the resilient body means on the side of the annular mass and an inner bridge of the resilient body means on the side of the carrier flange, aperture means in the resilient body means disposed on both sides of and adjacent to each of the plurality of sleeves, as viewed in the direction of rotation of said shaft for reducing the torsional stiffness of the resilient body means.

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**4,516,956**

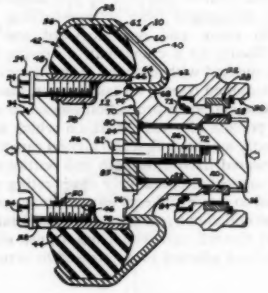
## WELD JOINT STRUCTURE FOR AN ELASTOMERIC FLEXIBLE COUPLING

**Richard W. Staiert, Geneseo, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Sep. 19, 1983, Ser. No. 533,476**

**Int. Cl.³ F16D** *3/26, 3/14*

**U.S. Cl. 464—89** **9 Claims**



1. In an elastomeric flexible coupling for connecting first and second shafts and being of the type having an inner hub connectable to the first shaft, an outer cup, and elastomeric ring means therebetween for torsional vibration and shock protection of a drive line, a weld joint structure comprising:

the cup being formed of a plurality of serially connected surfaces of revolution including a peripheral portion, a radially inwardly extending wall portion, a reverse bend transition portion, and a radially inner tubular portion extending from said reverse bend portion toward said peripheral portion defining an internal annular seat;

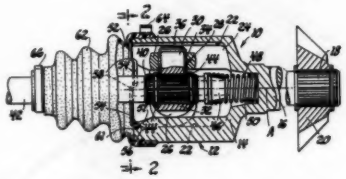
an adapter member connectable to the second shaft and defining an external annular seat; and

weld joint means for connecting the tubular portion of the cup to the adapter member with the seats in supporting and facing relation.

## 4,516,957
## TRIPOT JOINT WITH SPIDER RETAINER

George W. Chyz, Grosse Pointe Woods, and David J. McGregor, Saginaw, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 18, 1984, Ser. No. 601,609
Int. Cl.³ F16D 3/30
U.S. Cl. 464—111 4 Claims



1. In a universal joint having a centralized inner drive shaft, a drive assembly with a plurality of arcuately disposed drive elements operatively carried by said shaft, an outer drive housing disposed around said drive elements having an inner wall, a plurality of arcuately spaced drive channels in said inner wall of said housing, each of said drive elements being rotatably mounted with respect to said drive shaft and respectively disposed in said drive channels of said housing, the improvement comprising a curved resilient spring wire retainer, a retainer groove formed in said wall of said housing, said retainer having first segments releasably mounted within said retainer groove, said wire retainer further having blocker steps at the ends of the ends of said first segments projecting into the ends of said drive channels to reduce the effective width thereof to prevent the withdrawal of said drive elements and said inner drive shaft from drive connection with said drive housing and large diameter access segments interconnecting each of the blocker steps and extending externally of the housing and adjacent to one end thereof to provide external structure facilitating deflection of said retainer for the removal thereof from said groove and said housing and for the installation of said retainer into said groove and said housing.

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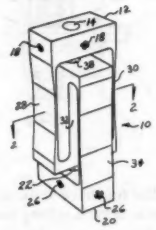
## 4,516,958
## FLEXIBLE SHAFT COUPLING DEVICE

Edward H. Phillips, Middletown, Calif., assignor to Hidden Valley Associates, Inc., Middletown, Calif.

Filed Nov. 3, 1983, Ser. No. 548,450
Int. Cl.³ F16D 3/56, 3/50
U.S. Cl. 464—153 11 Claims



1. A shaft coupler for coupling rotational motion from a first shaft to a second parallel shaft while permitting relative movement of the shafts along axes orthogonal to the longitudinal axes of the shafts, the coupler comprising:

first and second shaft attachment means for attaching the coupler to the first and second shafts;

a first pair of parallel arms attached to the first shaft attachment means and bendable about a first axis orthogonal to the longitudinal axes of the shafts;

a second pair of parallel arms attached to the second shaft attachment means and bendable about a second axis orthogonal to the longitudinal axes of the shafts, said first and second axes being orthogonal; and

a connecting member connected to the ends of the first pair of arms distant from the first attachment means and to the ends of the second pair of arms distant from the second attachment means, the connecting member being situated between the first and second pairs of arms.

7. A shaft coupler for rotatably coupling two parallel shafts and allowing displacement of the shafts perpendicular to the axes of rotation of the shafts, the coupler comprising:

first and second shaft attachment means for attaching the coupler to the shafts;

first flexible support means attached to the first shaft attachment means comprising a first pair of parallel support members each of which is more compliant to bending about an axis normal to the axes of rotation of the shafts than it is about any other axis for permitting translational movement of the first shaft attachment means along a first direction substantially perpendicular to the axes of rotation of the shafts;

second flexible support means attached to the second shaft attachment means comprising a second pair of parallel support members each of which is more compliant to bending about an axis normal to the axes of rotation of the shafts than it is about any other axis for permitting translational movement of the second shaft attachment means along a second direction substantially perpendicular to the axes of rotation of the shafts and to the first direction; and

connecting means connected to the first and second flexible support means and being situated between the first and second flexible support means for transmitting torque from the first flexible support means to the second flexible support means.

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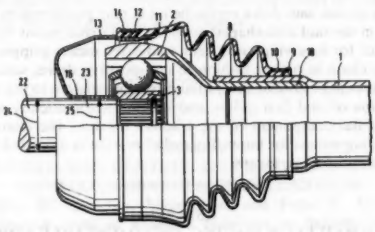
## 4,516,959
## SEALING BOOT FOR UNIVERSAL JOINT

Werner Krude, Siegburg-Kaldauen, Fed. Rep. of Germany, assignor to Uni-Cardan Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 15, 1983, Ser. No. 466,523
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1982, 3206127
Int. Cl.³ F16D 3/84
U.S. Cl. 464—175 1 Claim



1. A universal joint comprising:

an inner joint member and an outer joint member arranged to be angularly movable relative to each other;

a driveshaft connected in driving engagement with said outer joint member;

a sealing boot made of resilient material for sealing the interior of said joint having a first end formed with a smaller diameter and a second end formed with a larger diameter;

an intermediate element formed as a member bent upon itself shaped to define an inner annular part and an outer annu-

lar part which are radially overlapping, said outer annular part having a diameter larger than said inner annular part and extending thereabout generally concentrically therewith;

a pin member extending from said inner joint member having said inner annular part of said intermediate element mounted thereon for connecting said intermediate element with said inner joint member;

said inner annular part having a diameter engaging said pin member with a press fit;

said sealing boot being arranged with said first smaller diameter end connected with said driveshaft and with said second larger diameter end connected about said outer annular part of said intermediate element so that said sealing boot stretches over said outer joint member and is tightly connected to said driveshaft and to said intermediate element;

said outer annular part of said intermediate element being formed with a diameter which extends outwardly of and radially about said outer joint member and being shaped to comprise a receiving seat provided for receiving said second larger diameter end of said sealing boot, said receiving seat being directed toward said joint.

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**4,516,960**

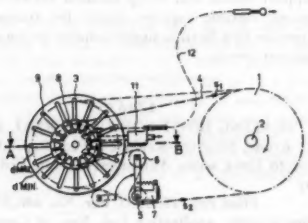
## VARIABLE SPEED CHAIN DRIVE

**Horst Rathert, Minden, Fed. Rep. of Germany, assignor to Rahdener Maschinenfabrik August Kolbus, Rahden, Fed. Rep. of Germany**

**Filed Jun. 20, 1983, Ser. No. 506,177**

**Int. Cl.³ F16H** *55/54, 9/00, 11/02, 55/30*

**U.S. Cl. 474—49** **17 Claims**



1. A variable speed chain drive comprising a pair of pulleys and a drive chain, at least a first one of said pulleys being in part defined by at least a first disk-shaped member, said disk-shaped member supporting a plurality of uniformly spaced drive means, said drive means being in part positioned in radial slots in the said disk-shaped member, said drive means defining a space for receiving said chain, said drive means gripping said drive chain in pincer fashion in non-positive drive, said drive means being movable in a radial direction relative to the axis of rotation of said first pulley and locking automatically against the radial component of the tractive force of the chain, and adjusting means for imparting radial motion in a desired direction to said drive means.

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**4,516,961**

## DERAILLEUR HAVING AN ADJUSTABLE FORK MEMBER FOR A CRANK-GEAR

**Maurice E. L. Coué , Feucherolles, France, assignor to Huret et ses Fils, Nanterre, France**

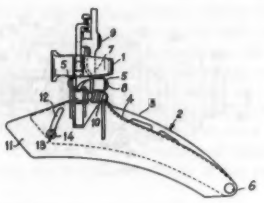
**Filed Dec. 23, 1982, Ser. No. 452,716**

**Claims priority, application France, Dec. 30, 1981, 81 24504**

**Int. Cl.³ F16H** *9/00*

**U.S. Cl. 474—80** **13 Claims**

1. A derailleur of a bicycle crank-gear having a small chain wheel and a larger chain wheel and a chain for engaging a selected one of said chain wheels, said derailleur comprising a support for fixing to a frame of the bicycle, a chain guiding and shifting means including a fork member articulated to the support, the fork member having a web and two wings depending from opposite sides of the web, a first of said wings being provided for engaging a first side of said chain when shifting the chain from said small chain wheel to said larger chain wheel and a second of said wings being provided for engaging a second side opposite said first side of said chain when shifting



said chain from said larger chain wheel to said small chain wheel, said first wing comprising a first wing part and a second wing part which define therebetween a width of the first wing and said first wing part being adjustable to a fixed position relative to said second wing part so as to adapt said width of said first wing to various diameters of the small chain wheel, and means for immobilizing said first wing part in the adjusted position thereof.

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**4,516,962**

## TENSION ROLLER FOR DRIVE BELTS

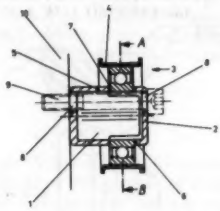
**Manfred Brandenstein, Eussenheim; Roland Haas, Hofheim; Ludwig Edelmann, Schweinfurt, and Rüdiger Hans, Niederwerrn, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany**

**Filed Dec. 14, 1983, Ser. No. 561,189**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 8235715[U]**

**Int. Cl.³ F16H** *7/10*

**U.S. Cl. 474—112** **3 Claims**



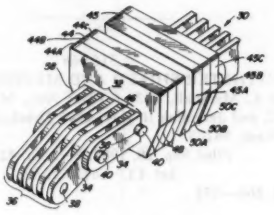
1. In a tension roller for drive belts, comprised of a support having a first eccentric bore, a rolling bearing having an inner ring mounted on a bearing seat of said support, and a roller rotatably arranged on said support by means of said rolling bearing, wherein said support is fastened to a machine frame by a screw arranged in said first eccentric bore and is eccentrically adjustable by rotation about said screw, the improvement wherein said support comprises a substantially solid pin on which said bearing seat is formed and a cup-shaped cover which engages said bearing seat, and said screw abuts said inner ring.

**4,516,963**

## POWER TRANSMISSION CHAIN-BELT

**Philip J. Mott, Des Plaines, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed May 23, 1983, Ser. No. 497,478**
**Int. Cl.³ F16G 5/18**
**U.S. Cl. 474—245** **14 Claims**



1. A chain-belt for drivingly connecting the pulleys of a pulley transmission, each pulley having a pair of flanges, comprising a plurality of sets of links interleaved with other sets of links, each link having a pair of spaced apertures, the apertures in one set of links being transversely aligned with the apertures of the next adjacent set of links which is interleaved therewith to form groups of aligned apertures, pivot means positioned in each group of aligned apertures to join said sets of links and to permit articulation of the chain-belt, and a generally trapezoidal-shaped load block transversely surrounding each set of links and positioned between the adjacent pivot means, each load block having angled side edges defining an engaging area for drivingly contacting the flanges of said pulleys, at least one load block having a pulley engaging area different than the pulley engaging areas of other load blocks.

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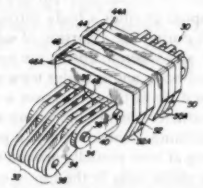
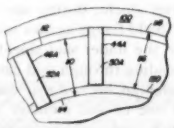
**4,516,964**

## POWER TRANSMISSION CHAIN-BELT

**Walter R. Laster, Arlington Heights, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed May 23, 1983, Ser. No. 497,479**
**Int. Cl.³ F16G 5/18**
**U.S. Cl. 474—245** **6 Claims**





1. A chain-belt for drivingly connecting the pulleys of a pulley transmission, each pulley having a pair of flanges, said chain-belt comprising a plurality of sets of links interleaved with other sets of links, each link having a pair of spaced apertures, the apertures in one set of links being transversely aligned with the apertures of the next adjacent set of links which is interleaved therewith to form groups of aligned apertures, pivot means positioned in each group of aligned apertures both to join said sets of links and to permit articulation of the chain-belt, and a generally trapezoidal-shaped load block transversely surrounding each set of links and positioned between the adjacent pivot means, each load block having angled side surfaces adapted to drivingly contact the flanges of said pulleys at least one of said load blocks having a different transverse width than the transverse width of others of said load blocks, so as to drivingly contact the pulley flanges at a different time and different radial location than do the other load blocks.

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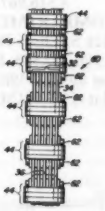
**4,516,965**

## POWER TRANSMISSION CHAIN-BELT

**Philip J. Mott, Des Plaines, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Filed May 23, 1983, Ser. No. 497,480**
**Int. Cl.³ F16G 5/18**
**U.S. Cl. 474—245** **6 Claims**



1. An endless chain-belt for drivingly connecting the pulleys of a pulley transmission, each pulley having a pair of flanges, comprising a plurality of sets of links interleaved with other sets of links, each link having a pair of spaced apertures, the apertures in one set of links being transversely aligned with the apertures of the next adjacent set of links which is interleaved therewith to form groups of aligned apertures, pivot means positioned in each group of aligned apertures to both join said sets of links and to permit articulation of the chain-belt, and contacting means surrounding sets of links and carried on the chain-belt for drivingly contacting the flanges of said pulleys, said contacting means surrounding only some sets of links and located between adjacent pivot means.

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**4,516,966**

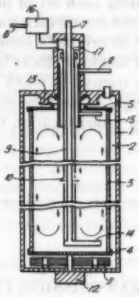
## CENTRIFUGES, CENTRIFUGE PLANTS AND FLOW CONTROL ARRANGEMENTS THEREFOR

**Geoffrey W. Alderton, Warrington, and Peter C. Davidge, Holmrook, both of England, assignors to British Nuclear Fuels Limited, Warrington, England**

**Filed Jul. 2, 1982, Ser. No. 394,883**
**Claims priority, application United Kingdom, Jul. 21, 1981, 8122371**
**Int. Cl.³ B04B 7/06**
**U.S. Cl. 494—1** **6 Claims**

1. In a gas centrifuge assembly comprising a cascade of individual gas centrifuge machines, the improvement comprising flow-operated valve means located in at least one of the gas flow lines associated with each machine in the cascade, the valve means being constructed and arranged to close in re-

sponse to an abnormal gas flow in the line and out of the machine arising from gaseous impurity within the machine,



whereby to inhibit the spread of the impurity to other centrifuge machines in the cascade.

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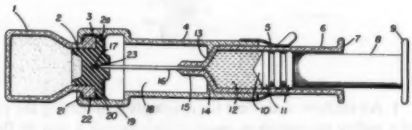
**4,516,967**

## WET-DRY COMPARTMENTAL SYRINGE

**Rudolph J. Kopfer, 1321 S. Eliseo Dr., Greenbrae, Calif. 94904**

**Continuation of Ser. No. 332,548, Dec. 21, 1981, abandoned.**
**This application Jul. 27, 1983, Ser. No. 517,050**
**Int. Cl.³ A61M *5/00***
**U.S. Cl. 604—87** **23 Claims**



1. A completely enclosed compartmental syringe disposed for storing and mixing a powdered medicament and a liquid solvent prior to injection comprising:

a container for storage of a predetermined quantity of said powdered medicament;

a puncturable seal of elastomeric material engaging an opening in said container;

a hollow tube projecting from said container and tightly engaging the circumference of said seal; said tube enclosing the entire syringe and forming a hermetically sealed compartment therefor;

said tube being made of flexible plastic material;

said tube being disposed for limited axial movement along the outside of said seal while maintaining tight contact therewith;

a cylindrical syringe barrel slidably positioned within said tube;

a removable hermetic seal joining said barrel and said tube;

a hypodermic needle having its first end positioned on one end of said barrel within said tube and connecting with the interior of said barrel;

a second end of said needle being positioned hermetically against said puncturable seal within said tube and partially penetrating said puncturable seal thus maintaining a seal on the interior of said barrel;

a plunger slidably mounted within said barrel;

said barrel containing a predetermined amount of said liquid solvent;

means for simultaneously advancing said tube and said barrel towards said puncturable seal on said container until said second end of said needle punctures said puncturable seal;

means for advancing said plunger in said barrel and discharging said solvent into said container thereby causing said powdered medicament to dissolve;

means for withdrawing said plunger thereby sucking such dissolved medicament into said barrel; and

means for removing said barrel together with said plunger and said needle from said tube,

said tube preventing contact between moving parts of said syringe with the outside atmosphere.

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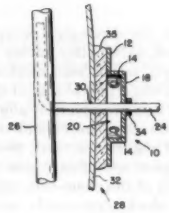
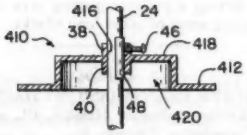
**4,516,968**

## CATHETER SHIELD AND METHOD OF USE

**Charles A. Marshall, 2937 - 181st Ave., N.E, Seattle, Wash. 98052, and Jeremiah B. Ray, 4546 Thacksray Pl., NE., Seattle, Wash. 98105**

**Filed Sep. 28, 1982, Ser. No. 425,494**
**Int. Cl.³ A61M *25/02***
**U.S. Cl. 604—174** **8 Claims**





1. A catheter shield kit, wherein said kit comprises an elastic catheter adapted to enter a body through a catheter entrance site, wherein during use a portion of said catheter is anchored in said body, and wherein during use a portion of said catheter is outside said body and is under tension;

wherein said kit further comprises a catheter anchor means and a catheter shield comprising a relatively stiff shield dome defining a shield cavity, a peripheral shield flange extending at least partially around said shield dome, and a catheter shield hole in the top of said shield dome generally aligned with said catheter entrance site;

wherein said catheter shield hole is sized to be adapted to receive said catheter therethrough;

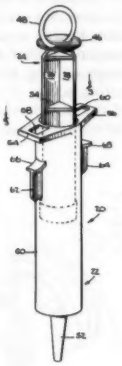
wherein said catheter shield, during use, is adapted to be placed with said shield flange against said body, with said catheter entrance site under said shield dome, and with said catheter extending through said catheter shield hole;

wherein said catheter anchor means, during use, are for securing at least one of said catheter and said catheter shield, and wherein said catheter anchor means, during use, are adapted to prevent longitudinal motion of said catheter shield away from said body with respect to said catheter; and wherein, during use, said tension of said portion of said catheter outside said body is adapted to pull on said catheter anchor means to urge said catheter shield snugly against said body, thereby eliminating the need to use adhesive media on said body to secure said catheter shield to said body.

## 4,516,969
## CONTROL SYRINGE

Michael H. Kintner, Manville, N.J., assignor to Medtech Plastics, Inc., South Plainfield, N.J.

Filed Apr. 14, 1983, Ser. No. 484,863
Int. Cl.³ A61M 5/00
U.S. Cl. 604—187 5 Claims

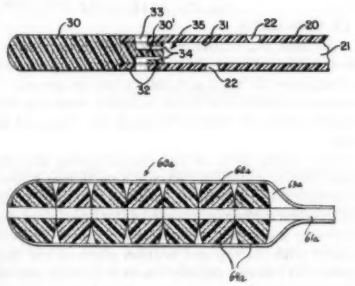


1. A control syringe barrel, comprising:
a substantially cylindrical body;
a pair of opposing, horizontal flanges extending from the top of the cylindrical body;
a pair of opposing, substantially horizontal flanges extending from the cylindrical body and located below the horizontal flanges; and
a substantially straight vertical flange located beneath each of the substantially horizontal flanges and contiguous therewith and with said cylindrical body said substantially straight vertical flange having a surface radially remote from and parallel to the axis of said cylindrical body, said surface extending substantially the entire length of said vertical flange.

## 4,516,970
## MEDICAL DEVICE

Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11566, and Donald E. Gardner, 89, The Helm, East Islip, N.Y. 11730

Filed Sep. 13, 1982, Ser. No. 417,695
Int. Cl.³ A61M 25/00
U.S. Cl. 604—270 26 Claims

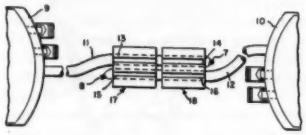


1. A medical device, particularly a catheter or feed tube, comprising a tube having a passage and being provided with a trailing end portion adapted to receive a flowable substance and a leading end portion; weighting means at said leading end portion and comprising an element composed of a mixture of powdered metal and synthetic plastic binder therefor, said element having two spaced ends and a channel which is open at said ends and communicates with said passage so that the flowable substance can pass from said tube into and through said element without hindrance; and outlet means for egress of flowable substance from said passage of said tube.

## 4,516,971
## STERILE DOCKING PROCESS, APPARATUS AND SYSTEM

Dudley W. C. Spencer, 619 Shipley Rd., Wilmington, Del. 19809

Filed Jul. 6, 1982, Ser. No. 395,795
The portion of the term of this patent subsequent to Jan. 25, 2000, has been disclaimed.
Int. Cl.³ A61M 5/00
U.S. Cl. 604—280 21 Claims



1. A process of joining first and second thermoplastic tubes together transversely of the axis of each tube comprising urging an array of hot parallel wires through both said tubes at a rate such that the thermoplastic resin from which said tubes are formed and which is in contact with said array becomes molten, thereby forming molten ends, maintaining the array of parallel wires at a temperature such that ambient air immediately within the vicinity of urging is kept sterile, moving the respective molten ends of said tubes together to form a joint between said tubes.

## 4,516,972
## GUIDING CATHETER AND METHOD OF MANUFACTURE

Wilfred J. Samson, Saratoga, Calif., assignor to Advanced Cardiovascular Systems, Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 343,588, Jan. 28, 1982, abandoned. This application Aug. 12, 1983, Ser. No. 522,833
Int. Cl.³ A61M 5/00
U.S. Cl. 604—282 6 Claims



1. In a guiding catheter for insertion into a body passage of a patient, an elongate flexible tubular plastic member having a lumen extending therethrough, the member having a distal end adapted to be inserted into the body passage and a proximal end adapted to remain outside the body passage, a flat flexible ribbon wound helically in a first single layer in one direction onto the exterior of the tubular plastic member and a second single layer overlying the first layer and wound helically in an opposite direction onto the exterior of the tubular plastic member, each of the first and second layers having different pitches in different regions along the length of the tubular plastic member, means bonding the helically wound ribbon to the exterior surface of the plastic member, said first and second layers of ribbon providing torsional rigidity to the catheter facilitating steering and turning of the catheter in the body passage, and an outer flexible tube formed of a heat shrinkable

material shrunk onto said elongate flexible tubular member with the ribbons bonded thereto to form a unitary assembly.

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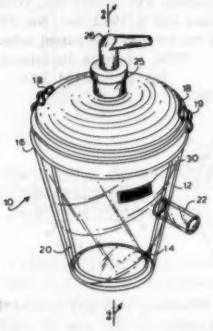
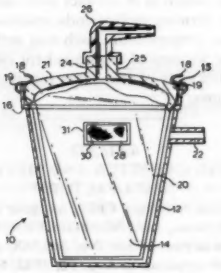
**4,516,973**

## ONE-PIECE DISPOSABLE COLLECTION BAG HAVING A RIGID COVER FOR A SUCTION CANISTER UNIT

**Anil Telang, Elizabeth, N.J., assignor to Becton, Dickinson and Company, Paramus, N.J.**

**Filed Mar. 14, 1983, Ser. No. 474,770**
**Int. Cl.³ A61M *1/00***
**U.S. Cl. 604—319** **19 Claims**





9. A suction canister assembly comprising:

a receptacle having an open end;

a one-piece, flexible enclosed liquid collection container positioned in said receptacle, said container including an integrally formed top wall means serving as an exterior cover for the canister assembly;

means for providing suction to the interior of said container and for drawing liquid in said container under said suction conditions; and

means for supporting said flexible container in said receptacle to prevent the container from collapsing and interfering with suction when the suction is applied to the interior of said container.

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**4,516,974**

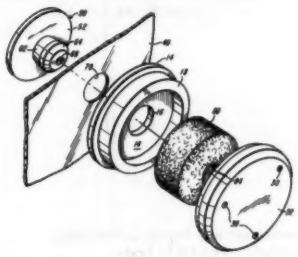
## UNIVERSAL VENT DEVICE AND METHOD FOR OSTOMY APPLIANCES

**Jeffrey J. Davis, New Lebanon, Ohio, assignor to Imnetec Inc., Vandalia, Ohio**

**Filed Dec. 13, 1982, Ser. No. 449,455**
**Int. Cl.³ A61F *5/44***
**U.S. Cl. 604—333** **25 Claims**

1. A universal vent device for attachment to a pouch of an ostomy appliance, the pouch having an enclosure wall, comprising:

a housing including a base provided with a cylindrical wall, the base of the housing having an opening therethrough, a cover member having a cylindrical flange tightly encompassing and removably attached to the cylindrical wall, the cover member having a vent opening therethrough, a connector member provided with a base and stem means extending from the base, the stem means having a cutter part, the stem means having a passage therethrough, the base of the connector member being within the pouch with the stem means cutting the enclosure wall of the pouch in a die-cutting action and extending through the enclosure wall of the pouch, the housing being on the exterior surface of the enclosure wall of the pouch, the



stem means snugly extending through the opening in the base of the housing and attaching the connector member to the base of the housing, the part of the enclosure wall of the pouch which encompasses the opening in the enclosure wall thus being clamped between the base of the housing and the base of the connector member, a portion of the stem means being within the housing, and a gas permeable filter element encompassing the stem means within the housing, gases within the pouch traveling from the pouch through the passage within the stem means, then through the gas permeable filter element in the housing and outwardly from the housing through the vent opening in the cover member, the cover member being readily removable from the cylindrical wall to permit access to the gas permeable filter element for replacement thereof.

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**4,516,975**

## FORMED AND WASHABLE DIAPER

**Debra J. Mitchell, 110 Calvert Ct., Piedmont, Calif. 94611**

**Filed Mar. 12, 1984, Ser. No. 588,349**
**Int. Cl.³ A41B *13/02***
**U.S. Cl. 604—385 A** **3 Claims**

1. A formed and washable diaper comprised of

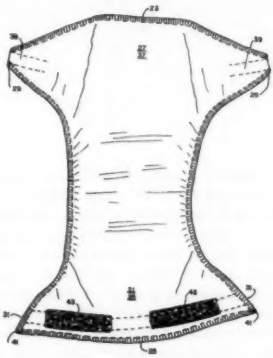
a multiplicity of layers of material including a non-allergenic outer layer forming a moisture barrier cover,

a moisture retentive mildew resistant washable felt layer,

a middle layer of batting forming the frame of the diaper, and

an inner facing layer of soft non-irritating absorbent washable fabric, said diaper having a particular body enclosing configuration due to its construction which includes an hour-glass outline with each of the hour-glass shaped sides forming a continuous sculpted crescent shaped concave curve with the top and bottom edges of the diaper being generally curved slightly convex upward and downward respectively, the upper end of said diaper being slightly longer in lateral length than the bottom end whereby when the diaper is placed on the wearer with the top end disposed at the back of the wearer's body and with the bottom end pulled up between the wearer's legs and disposed on the front of the wearer's body on the stomach,

the two lateral edges of the top end of the diaper will wrap around the wearer's body from behind and overlap the two lateral edges at the bottom end of the diaper disposed on the wearer's stomach, the laterally curved vertically disposed edges of the diaper being provided with an elastic edging which is secured to said material for a portion of the length of the curved edges which surround the wearer's leg when the diaper is disposed in operative position whereby when the elastic is released after being secured to the diaper in a stretched condition along the edge of said diaper and allowed to retract, said diaper is retracted into a U-shaped configuration with the resulting



opposed portions being the front and rear flaps of said diaper, the outer edges of said inner, middle, and outer layers of said material being co-extensive throughout the extent of the configuration of the diaper, said absorbent felt layer being disposed in a narrow rectangular strip from the top to the bottom down the middle of said diaper to provide extra absorbency throughout the middle portion of said diaper, and

tabs formed by the top and bottom lateral edges or corners of said diaper being provided with adjustable stick and grip fasteners for securing said overlapping lateral edges together to hold the diaper on the wearer's body.

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**4,516,976**

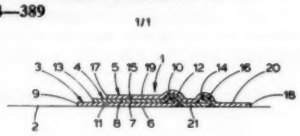
## ADHESIVE TAPE FASTENERS

**John E. Bell, Columbia, S.C., assignor to Anchor Continental Inc., Columbia, S.C.**

**Filed Jun. 13, 1983, Ser. No. 504,026**

**Int. Cl.³ A41B** *13/02*

**U.S. Cl. 604—389** **8 Claims**



**1.** In a user-operable, finger-manipulable, adhesive tape-fastener for a disposable sanitary absorbent baby-diaper, which diaper has a front pervious body-contacting surface and also a moisture-impermeable back surface,

a first adhesive tape, a second adhesive tape, and a third adhesive tape, each of which has a back face and a front face,

said front faces each being coated with pressure-sensitive adhesive,

said first adhesive tape having a free end, a fixed end, and a portion between the free end and the fixed end,

said first adhesive tape adapted for attachment to a marginal portion of the front surface of the diaper to form a first anchor tab,

said fixed end of the first adhesive tape being joined to the adhesive face of the second adhesive tape to form a first join,

said second adhesive tape having a free end, a fixed end, and a portion between the first join and free end to form a first fastener tab,

said fixed end of said second adhesive tape being joined to the adhesive face of the third adhesive tape to form a second join,

said third adhesive tape having a first free end, a second free end, and a first portion between the first free end and the second join adapted to form a second fastener tab,

said second adhesive tape having a second portion between the second free end and the second join adapted for user-operable attachment to a marginal portion of the back surface of the diaper to form a second anchor tab,

said first adhesive tape having a release surface on the back face thereof,

said fastener tab adhesive tape being removably attached to the release surface of the back face of the first adhesive tape,

said first fastening tab having a release surface on the back face thereof;

the adhesive face of the second fastener tab being removably attached to the release surface of the back face of the first fastening tab.

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**4,516,977**

## STORAGE BAG

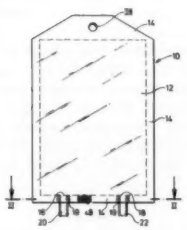
**Reinhold Herbert, Neu-Anspach, Fed. Rep. of Germany, assignor to Fresenius, AG, Fed. Rep. of Germany**

**Filed Feb. 16, 1984, Ser. No. 580,850**

**Claims priority, application Fed. Rep. of Germany, Feb. 17, 1983, 3305365**

**Int. Cl.³ A61M** *5/14*

**U.S. Cl. 604—415** **19 Claims**



**1.** A medical bag for containing liquids comprising a flexible bag body of plasticizer free thermoplastic polymeric material durable to autoclave sterilization to at least 120° C.,

at least one substantially dimensionally stable tubular polymeric port member inserted into said bag body, wherein the polymer of said port member is different from the polymeric bag material,

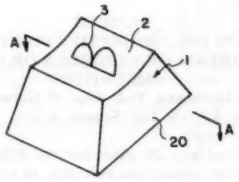
a bonding layer between said port member and the portions of the bag body in contact therewith of uncross-linked copolymer of olefin and vinyl acetate or of polyurethane.

4,516,978

## COLORED CHARACTER PRINTED ON KEY BUTTON

Hideo Goto; Takeo Hosoe; Toshinori Oda, and Sosuke Ohtsuka, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Sep. 19, 1983, Ser. No. 533,573
Claims priority, application Japan, Sep. 29, 1982, 57-170577
Int. Cl.³ H01H *13/14*
U.S. Cl. 8—510 7 Claims




1. A key button formed by molding a synthetic resin and provided on a top surface thereof with a character or symbol, wherein said character or symbol is printed on said top surface with a coloring agent comprising methyl violet dye, a nitrocellulose binder and a ketonic solvent, said solvent being capable of dissolving said dye and said synthetic resin, whereby said solvent acts on said synthetic resin to cause said dye to permeate through said top surface and into said button, and said binder acts to bind the molecules of said methyl violet to each other and to the molecules of said synthetic resin, wherein said synthetic resin is acrylonitrile-butadiene-styrene resin.

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4,516,979

## POLYBENZOATES AS DISPERSE DYEING ASSISTANTS

Hans-Peter Baumann, Ettingen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Dec. 23, 1982, Ser. No. 452,230
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1981, 3151433; Jan. 2, 1982, 3200003
Int. Cl.³ D06P *1/65;* C09B *1/60*
U.S. Cl. 8—583 20 Claims

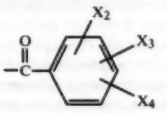
1. A composition comprising an aqueous emulsion of a compound of formula III

$$X—OX_1)_p \qquad \text{III}$$

wherein

X is a divalent $C_{2-8}$ saturated aliphatic hydrocarbon radical, a trivalent $C_{3-6}$ saturated aliphatic hydrocarbon radical, a pentavalent residue of glucose less its hydroxyl groups, a polyvalent residue of a disaccharide less its hydroxyl groups, or a divalent radical of the formula $—C_qH_{2q}—O—C_rH_{2r}—$ wherein q and r are independently 2, 3, or 4,

each $X_1$, independently, is hydrogen or a radical of formula IV




IV

in which $X_2$, $X_3$ and $X_4$ are the same or different and are hydrogen, chloro, $C_{1-4}$alkyl or $C_{1-4}$alkoxy

and p is a whole number equal to the valence of X, with the proviso that when p is 2 both $X_1$'s are radicals of formula IV and when p is greater than 2 more than an average value of 50% of the $X_1$'s are radicals of formula IV,

and 5 to 30%, based on the weight of said compound, of an anionic emulsifying agent.

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4,516,980

## PROCESS FOR PRODUCING LOW-ASH, LOW-SULFUR COAL

Thomas D. Wheelock, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jun. 20, 1983, Ser. No. 506,031
Int. Cl.³ C10L *9/02*
U.S. Cl. 44—1 SR 4 Claims

1. The process of treating finely ground coal for removal of pyritic sulfur, organic sulfur, and ash-forming minerals, including the steps of treating the coal in an aqueous alkaline solution at an elevated temperature followed by extraction with an aqueous acidic solution, wherein the improvement comprises:

(a) forming a slury of finely-divided coal with an aqueous solution of a carbonate reagent selected from the class consisting of sodium carbonate and bicarbonate, and heating said slurry in a pressurized reactor while in contact with dissolved oxygen, said reactor being maintained at a temperature of from 120° to 150° C. and at an oxygen pressure or partial pressure of 50 to 200 psia;

(b) next heating the coal from step (a) in an aqueous slurry of said carbonate reagent at a temperature of from 250° to 330° C. under substantially non-oxidizing conditions; and

(c) after separating the coal from the slurry of step (b) carrying out an aqueous acidic extraction with a strong mineral acid to solubilize ash-forming minerals.

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4,516,981

## RESIDUAL OIL SLUDGE DISPERSANT

Otis L. Nelson, Jr., and Mark L. Nelson, both of 2543 So. Two Mile Rd., Bay City, Mich. 48706

Filed Jan. 9, 1984, Ser. No. 569,160
Int. Cl.³ C10L *1/18*
U.S. Cl. 44—53 13 Claims

1. A residual oil sludge dispersant comprising a low molecular weight alkyl alcohol; a glycol ether; and a polyethoxylated compound, said alcohol being present in an amount of 20–30 percent by weight, said glycol ether comprising a glycol alkyl ether present in an amount of 10–20 percent by weight, and said ethoxylated compound being present in an amount of 50–75 percent by weight.

10. In combination;

a residual oil having sludge and water; and a dispersant 1 part of dispersant to 1,000–4,000 parts of oil consisting essentially of a low molecular weight alcohol 20–30 percent by weight, a glycol ether 10–20 percent by weight, and a polyethoxylated compound 50–70 percent by weight, wherein the dispersant disperses sludge and precipitates out water from the residual oil.

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4,516,982

## ANTIMISTING SYSTEM FOR HYDROCARBON FLUIDS

Ilan Duvdevani, Leonia; Dennis G. Peiffer, East Brunswick; John A. Eckert, Mountainside, and Robert D. Lundberg, Bridgewater, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Nov. 2, 1983, Ser. No. 547,905
Int. Cl.³ C10L *1/24*
U.S. Cl. 44—62 10 Claims

1. An antimisting hydrocarbon solution comprising a jet fuel and a polymer complex, wherein the concentration of said polymer complex in said solution is about 0.01 to about 2 grams per 100 ml of said solution and said polymer complex comprises the interaction product of a metal neutralized sulfonated polymer and an amine containing polymer which has a vinyl pyridine comonomer incorporated therein, said metal neutralized sulfonated polymer having a polymer backbone which has a solubility parameter of less than about 10.5 and a crystallinity of less than about 25%, said metal neutralized sulfonated poly-

mer containing about 4 to about 200 meq. of metal neutralized sulfonate groups per 100 gram of polymer, said metal neutralized sulfonate groups being neutralized with a metal ion selected from the groups consisting of zinc, copper, iron, nickel, cobalt, antimony and lead, the nitrogen content of the amine containing polymer is about 4 meq. to about 500 meq. per 100 gram of polymer, said amine containing polymer being soluble in said jet fuel.

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**4,516,983**

**Patent Not Issued For This Number**

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**4,516,984**

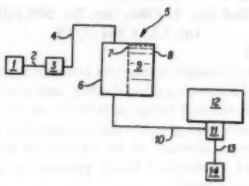
## DEGASSING PROCESS AND APPARATUS FOR REMOVAL OF OXYGEN

**Isiah M. Warner, Stone Mountain, Ga., and Chu-Ngi Ho, Johnson City, Tenn., assignors to Emory University, Atlanta, Ga.**

**Filed Nov. 8, 1983, Ser. No. 549,737**

**Int. Cl.³ B01D** *53/22*

**U.S. Cl. 55—16** **23 Claims**



**1.** A method for decreasing the oxygen content of a fluid stream which comprises:

contacting said fluid with one side of a membrane capable of passing oxygen and retarding the passage of said fluid wherein said contacting takes place in a container permeable to oxygen only through said membrane and the second side of said membrane is in contact with a chemically deoxygenating environments.

**13.** An apparatus for deoxygenating a fluid stream, which comprises:

a membrane capable of passing oxygen and retarding the passage of said fluid;

first containing means for maintaining said fluid in contact with one side of said membrane, said first containing means being impermeable to oxygen except through said membrane and having inlet and outlet means through which said fluid is conducted into and out of said first containing means; and

second containing means for maintaining a chemically deoxygenating environment in contact with a second side of said membrane wherein said liquid containing means contains a chemically deoxygenating environment selected from the group consisting of solutions of chromus ions, mixtures of lithium aluminum hydride and benzopinacolone in pyridine, alkaline aqueous solutions of pyrogallol, Fieser's solutions, aqueous sodium dithionite solutions, benzophenone ketyl-containing organic solvents, reduced BTS catalyst, solutions of sodium sulfite, solutions of hydrazine, and solutions of vanadous sulfate.

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**4,516,985**

## METHOD FOR THE ABSORPTIVE PURIFICATION OF A GAS STREAM OF VAPOROUS OR GASEOUS IMPURITIES

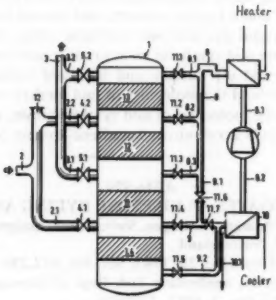
**Karl Winter, Dortmund, Fed. Rep. of Germany, assignor to Rekuperator KG Dr.-Ing. Schack & Co., Düsseldorf, Fed. Rep. of Germany**

**Filed Aug. 25, 1983, Ser. No. 526,555**

**Claims priority, application Fed. Rep. of Germany, Aug. 28, 1982, 3232134; Jun. 9, 1983, 3320735**

**Int. Cl.³ B01D** *53/04*

**U.S. Cl. 55—18** **6 Claims**




**1.** Method for operating a multi-layer sorption filter with a plurality of sorption material layers in which the number of layers is designated n, wherein n is an integer and has a value of at least 4, for purification of a gas stream containing gaseous or vaporous impurities, desorption of the sorption material layers loaded with the adsorbed impurities and cooling of the sorption material layers after their desorption, which comprises;

purifying a gas stream containing said impurities by dividing said gas stream in $(n-1)$ smaller gas streams, passing these smaller gas streams through $(n-1)$ of said n layers in parallel flow, with the $n^{th}$ sorption material layer remaining outside the flow of the gas streams being purified, and discharging purified gas from the sorption filter;

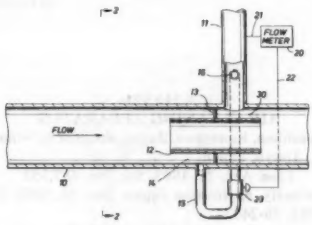
desorption of all n sorption material layers by feeding heated gaseous desorption medium through said layers, wherein the $n^{th}$ of said layers is the last layer the direction of the flow of the desorption gas through which all the desorption gas is circulated in a closed loop, in which the gaseous desorption medium containing desorbate from the sorption filter is cooled to condense the desorbate, reheated, and recirculated to the sorption filter, and discharging the condensed desorbate; cooling the group of $(n-1)$ sorption material layers independently of the cooling of the $n^{th}$ sorption material layer by feeding cooled desorption gas through either one of the group of $(n-1)$ sorption material layers and the $n^{th}$ sorption material layer and changing the feeding to the other after the first has become cold.

4,516,986

## TWO-PHASE FLOW SPLITTER

John C. Jepsen, Spring, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 29, 1984, Ser. No. 594,500
Int. Cl.³ B01D 47/00
U.S. Cl. 55—18 14 Claims




9. A method for withdrawing, with minimum pressure loss, a portion of a vapor-liquid fluid flowing in a main line while maintaining a preset vapor-liquid ratio in the withdrawn fluid, said method comprising:

restricting the flow of the fluid in the main line;

removing a portion of the liquid from the fluid in the main line upstream of the restricted flow;

withdrawing a portion of the fluid from the main line in the low pressure area produced by said flow restriction; and

combining a preset portion of the liquid removed from the main line with the portion of the fluid withdrawn from the main line.

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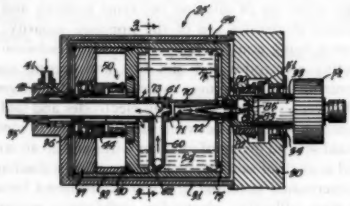
4,516,987

## DEAERATOR USABLE IN A SYSTEM FOR A STEAM POWERED TORPEDO AND DEAERATING METHOD

Richard E. Niggemann, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 21, 1983, Ser. No. 515,591
Int. Cl.³ B01D 19/00; F42B 19/00; F04B 23/04
U.S. Cl. 55—52 11 Claims



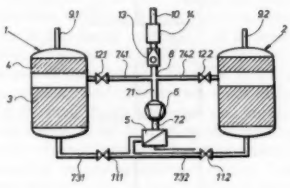
11. The method of removing air from liquid with entrained air comprising, centrifuging a volume of liquid and air within a rotatable drum to separate the liquid from the air, positioning a pitot probe within the rotatable drum to draw liquid from the rotatable drum under pressure, diverting a portion of said liquid under pressure to a liquid-driven air jet pump located within the rotatable drum and communicating with the separated air to pump air into a collection chamber and build up the pressure of the air in said collection chamber, and discharging pressurized air from the collection chamber.

4,516,988

## METHOD AND APPARATUS FOR PURIFYING A GAS STREAM IN A SORPTION FILTER

Karl Winter, Dortmund, Fed. Rep. of Germany, assignor to Rekuperator KG Dr.-Ing. Schack & Co., Düsseldorf, Fed. Rep. of Germany

Filed Aug. 25, 1983, Ser. No. 526,557
Int. Cl.³ B01D 53/04
U.S. Cl. 55—59 14 Claims



1. Method for the purification by adsorption in a sorption medium of a gas stream loaded with organic gases or vapors, especially up to near the saturation limit, in a sorption filter, which comprises circulating a gas in a loop through a sorption medium layer, introducing a gas stream to be purified containing organic impurities from a source outside of the loop into the circulating gas stream at a point in the loop prior to passage through the sorption medium layer, maintaining a volumetric flow of the circulating gas which is larger than the volumetric flow of the gas to be purified introduced into the circulating gas stream passing the mixture of circulating gas and gas containing organic impurities through the sorption medium layer to remove organic impurities, withdrawing a portion of said purified mixture of gases after passage through the sorption medium layer, maintaining a volumetric flow of said portion of gases which substantially corresponds to the volumetric flow of the gas to be purified, and continuing the circulation of the remainder of the purified mixture of gases as circulating gas to the mixing point to be mixed with gas to be purified and circulating this mixture of gases to the sorption medium layer.

8. Apparatus for the purification of a gas stream loaded with organic gases or vapors comprising a gas loop with a circulatory blower and connecting pipes connected to a container of a sorption filter, a feedline for the gas to be purified opening into the loop on the suction side of the blower, said container of the sorption filter having at least two sorption medium layers which are separated from each other to provide a space therebetween said loop having its return line from the container opening into said space between the two layers, and a purified gas outlet in the container above the sorption medium layer above said space for the discharge of purified gas.

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4,516,989

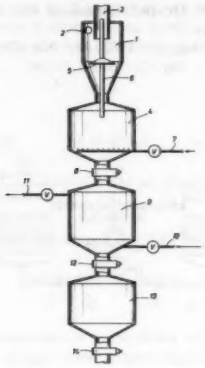
## PROCESS FOR REMOVING FLY ASH PARTICLES FROM A GAS AT ELEVATED PRESSURE

Bernardus H. Mink, and Willem J. A. H. Schoeber, both of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 429,779, Sep. 30, 1982, abandoned. This application May 31, 1984, Ser. No. 615,849
Claims priority, application Netherlands, Dec. 30, 1981, 8105903
Int. Cl.³ B01D 45/12
U.S. Cl. 55—68 8 Claims

1. A process for removing fly ash particles from a gas at elevated pressure comprising separating the fly ash particles in a cyclone, and collecting the separated fly ash particles in a collecting vessel, emptying said vessel at intervals via a sluice into a vessel having a lower pressure, the gas entering the

collecting vessel from the sluice while the vessel is being emptied being discharged via a pipe coaxially arranged in the



cyclone and extending from the collecting vessel to a point in the gas outlet of the cyclone.

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**4,516,990**

## METHOD OF REMOVING SOOT FROM EXHAUST GASES

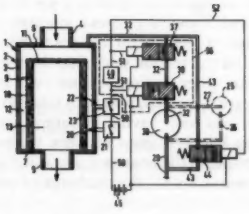
**Hans Erdmannsdörfer, Ludwigsburg; Manfred Wagner, Stuttgart; Rudi Numrich, Weinstadt, and Gerd Weyh, Leonberg-Eltingen, all of Fed. Rep. of Germany, assignors to Filterwerk Mann & Hummel GmbH, Ludwigsburg, Fed. Rep. of Germany**

**Filed Jul. 16, 1984, Ser. No. 631,088**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1983, 3325391**

**Int. Cl.³ B01D** *46/04*

**U.S. Cl. 55—96** **9 Claims**



1. A method of removing soot form the exhaust gas of an internal combustion engine, particularly of a diesel engine, comprising the steps of:

filtering the soot particles from the exhaust gas by means of an exhaust filter which retains and collects the soot;

during operation of the engine, form time to time burning off the collected soot to a gas which passes through the exhaust filter by adding to the soot a dose of a flowable combustion-inducing substance which lowers the soot ignition temperature and by also adding a supply of combustion air, the combustion-inducing substance being a mixture of copper(I) chloride and ammonium nitrate;

monitoring the temperature inside the exhaust filter and using the presence of an operating temperature above a predetermined level as a precondition for the initiation of the burn-off step; and

monitoring the accumulation of soot in the exhaust filter, in terms of the resultant increase in the flow resistance across the filter, and using the presence of a predetermined flow resistance as a trigger condition for the initiation of the burn-off step.

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**4,516,991**

## AIR CLEANING APPARATUS

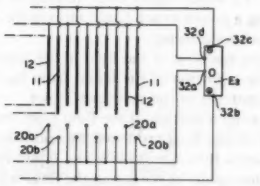
**Ryozo Kawashima, Kanagawa, Japan, assignor to Nihon Electric Co. Ltd., Tokyo, Japan**

**Filed Apr. 25, 1983, Ser. No. 487,952**

**Claims priority, application Japan, Dec. 30, 1982, 57-228284; Feb. 18, 1983, 58-24831**

**Int. Cl.³ B03C** *3/08, 3/32*

**U.S. Cl. 55—124** **2 Claims**

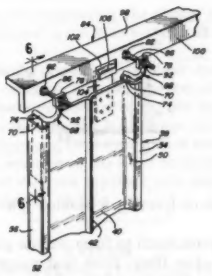



1. An air cleaning apparatus, comprising a casing having an air flow inlet and air flow outlet, a plurality of dust collecting panel electrodes arranged in parallel and spaced from each other at predetermined intervals to form air flow passages therebetween, said electrodes having ends, a first group of ionizing wires arranged at a first predetermined distance from said ends and extended along imaginary lines projecting intermediate said intervals and away from said intervals; a second group of ionizing wires positioned at a greater predetermined distance from said ends than that of said first group, the ionizing wires of the second group extending substantially along imaginary extension lines projecting from the respective dust collecting electrodes; a voltage source connected to said dust collecting electrodes and said first and second group of ionizing wires such that said first group and said second group of the ionizing wires are of one and the same polarity and said dust collecting electrodes are of the opposite polarity, said voltage source being constructed so as to apply between said dust collecting electrodes and said first and second second group of ionizing wires a voltage so that corona discharges are produced between said dust collecting electrodes and said first group of ionizing wires and between said first group of ionizing wires and said second group of ionizing wires and an air stream is generated at each of said intervals by the corona discharges, and a predetermined potential gradient is produced between respective dust collecting electrodes; connecting means for connecting said voltage source to said first and second group of ionizing wires so as to apply between said dust collecting panel electrodes and said first group a voltage value of substantially $\frac{1}{2}$ of the voltage value applied between said dust collecting electrodes and said second group of ionizing wires, said dust collecting panel electrodes being each coated with an ozone decomposion-accelerating noble metal plating layer; ozone insulating plates mounted at said inlet and at ends of said ionizing wires and said dust collecting electrodes so as to prevent ozone generation thereon; and an ozone decompositing activated coal filter arranged at said air flow outlet.

## 4,516,992
## APPARATUS AND METHOD FOR STRAIGHTENING ELECTROSTATIC PRECIPITATOR COLLECTOR PLATES

Robert E. Jonelis, 142 W. Lake Shore Dr., Tower Lakes, Barrington, Ill. 60010

Filed Nov. 28, 1983, Ser. No. 555,530
Int. Cl.³ B03C 3/47
U.S. Cl. 55—145 14 Claims



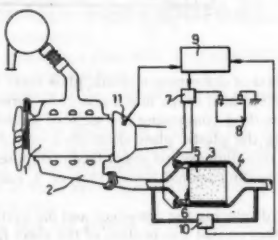
1. In an electrostatic precipitator having a plurality of substantially vertical collector plates held by a support with electrodes positioned between the collector plates, the improvement comprising; an elongated bar connected to one of the collector plates adjacent to one end of the plate, a bracket fixed to the bar, a connector having one end fixed relative to the support, and a lock connected to the bracket securing the bracket to the connector at a selected position so as to hold the bar in a selected attitude relative to the plate and to apply a torque to the one end of the plate.

11. A method of straightening a collector plate in an electrostatic precipitator wherein the collector plate is bowed comprising the following steps; connecting an elongated bar to the collector plate, securing one end of a connector to a fixed portion of the electrostatic precipitator, applying a torque moment to the elongated bar to apply a torque moment to the plate to remove the bowed condition, and locking the elongated bar relative to the connector to hold the torque bar in a selected attitude relative to the collector plate to hold the plate in an unbowed condition.

## 4,516,993
## CARBON PARTICULATES CLEANING DEVICE

Yukihisa Takeuchi, Chita, and Masahiro Tomita, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya and Nippon Soken, Inc., Nishio, both of, Japan

Filed May 31, 1983, Ser. No. 499,404
Claims priority, application Japan, Jun. 1, 1982, 57-93325
Int. Cl.³ B01D 46/42
U.S. Cl. 55—283 11 Claims



1. An exhaust gas cleaning device for collecting carbon particulates in exhaust gases discharged from an engine and burning off the collected carbon particulates, comprising:

a casing having an inlet port and a discharge port for introducing and discharging said exhaust gases;

a filter member for collecting carbon particulates in said exhaust gases which is disposed within said casing between said inlet port and said discharge port; said filter member being made of heat resistant material and being provided with a large number of open passages through which said exhaust gases flow;

an electric heater means for heating and igniting the carbon particulates collected by said filter member; said electric heater means being composed of at least two kinds of heating resistors which are constructed so as to provide different electric power densities to be applied to said filter member, said at least two kinds of heating resistors being adhered to the upstream end surface of said filter member so as to be distributed thereon uniformly;

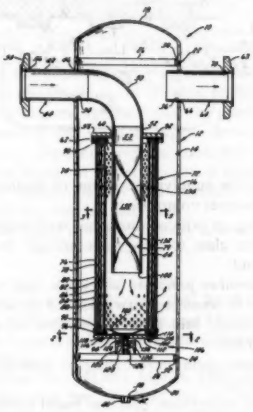
an electric current supplying means connected to said heater means for supplying electric current from an electric power source to said at least two kinds of heating resistors in succession in the order of from one providing the maximum electric power density to one providing the minimum electric power density at predetermined time intervals; and

means connected to said electric current supplying means for detecting when the amount of the carbon particulates collected by said filter member reaches a predetermined level and for initiating operation of said electric current supplying means.

## 4,516,994
## APPARATUS FOR SEPARATING LIQUID DROPLETS FROM GAS

Erich J. Kocher, Milwaukee, Wis., assignor to Vilter Manufacturing Corporation, Milwaukee, Wis.

Filed Apr. 11, 1984, Ser. No. 598,992
Int. Cl.³ B01D 45/12
U.S. Cl. 55—337 9 Claims



1. Apparatus for separating liquid droplets from gas in which they are suspended comprising:

a hollow housing having a chamber therein;

a filter element mounted in said chamber and spaced from the walls thereof and above the floor thereof,

said filter element having a bore therein open at its upper end and closed at its lower end,

said filter element having a porous exterior surface and a porous interior surface confronting said bore;

an inlet conduit extending into said housing and into the

open end of said bore for directing a mixture of liquid droplets and gas into said bore, said inlet conduit having a passage therethrough defined by a wall, said inlet conduit being spaced from said interior surface of said bore and from said closed lower end of said filter element;

means for sealing the space at the open end of said bore between the outside of said inlet conduit and said filter element;

deflector means mounted in said inlet conduit for directing said mixture therethrough and transversely against said wall of said passage and from thence into said bore and through said filter element;

a gas outlet conduit extending into said housing and communicating with said chamber for conducting filtered gas from said chamber;

and a liquid outlet conduit extending into said housing near the bottom of said chamber for conducting filtered liquid drained from the exterior of said filter from said chamber.

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**4,516,995**

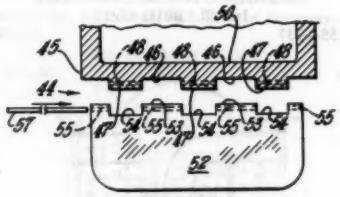
## APPARATUS FOR FORMING GLASS FIBERS

**Mohinder S. Bhatti, Granville; Thomas J. Porzio, and Monte L. Nagy, both of Newark, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Jul. 20, 1984, Ser. No. 632,762**

**Int. Cl.³ C03B *37/09***

**U.S. Cl. 65—1** **8 Claims**



1. A feeder for supplying streams of molten glass to be drawn into filaments comprising:

a body having an orificed discharge wall adapted to permit said molten glass to flow therethrough to provide said streams; and

a terminal member joined to said body, said member being adapted to be connected to a source of electrical energy to heat said body, said terminal member being a laminate comprised of:

(a) a refractory metal core having at least one articulated edge portion;

(b) a oxygen impervious, precious metal connector section joined to said body, said connector section having an articulated edge portion mechanically interlocked with said articulated edge portion of said refractory metal core; and

(c) an oxygen impervious, precious metal sheath positioned around said core and in contact with said connector section, said core, connector section and sheath being intimately bonded together by hot isostatic pressing to form a unitary laminate, wherein the connector section and sheath protect the core from oxidation at elevated temperatures.

**4,516,996**

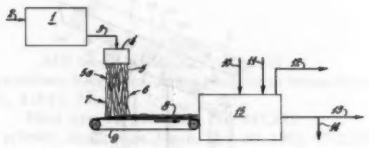
## FORMATION OF MOLDED GLASS FIBER PARTS FROM GLASS FIBER BLANKETS AND PRODUCT

**G. Fred Willard, and David A. Hutchings, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation of Ser. No. 483,011, Apr. 7, 1983, abandoned. This application Aug. 29, 1984, Ser. No. 645,537**

**Int. Cl.³ C03C *24/02***

**U.S. Cl. 65—3.43** **9 Claims**



1. A method of forming a molded glass fiber part which comprises:

(a) melting glass batch to form molten glass;

(b) forming glass fibers from said molten glass, said glass fibers being discharged from a spinner;

(c) contacting the discharged fibers with a binder, a phenolic resin and a liquid polyisocyanate as the discharged fibers are descending from said spinner;

(d) accumulating the discharged fibers in contact with the binder, a phenolic resin and a liquid polyisocyanate on a conveyor;

(e) introducing the discharged fibers from (d) into a mold; and

(f) contacting the fibers within the mold with a tertiary amine while molding the fibers to form a molded glass fiber part.

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**4,516,997**

## METHOD OF AND APPARATUS FOR VACUUM SHAPING A GLASS SHEET

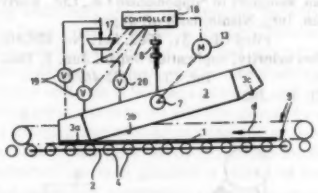
**Paul Derner, Gelsenkirchen; Rüdolf Eckardt, and Hans-Christoph Neuendorf, both of Wesel, all of Fed. Rep. of Germany, assignors to Flachglas Aktiengesellschaft, Fürth, Fed. Rep. of Germany**

**Filed Oct. 3, 1983, Ser. No. 538,579**

**Claims priority, application Fed. Rep. of Germany, Oct. 1, 1982, 3236400; Jan. 7, 1983, 3300388**

**Int. Cl.³ C03B *23/035***

**U.S. Cl. 65—106** **19 Claims**




1. A method of deforming a plastic glass sheet from a generally two-dimensional shape into a generally three-dimensional shape, the method comprising the steps of sequentially:

supporting the plastic glass sheet on a conveyor with the sheet's two-dimensional upper face juxtaposed underneath the three-dimensional lower face of a vacuum-forming die;

relatively displacing the conveyor and die vertically toward each other so that one portion of the sheet face engages a respective portion of the die face;

securing the two portions together by suction, whereby the

sheet adheres at the one portion of its face to the respective portion of the die face; and

relatively rocking the conveyor and die about a horizontal axis with deformation of the sheet to press the rest of the sheet face and die face together and adhering the faces entirely together by suction.

13. An apparatus for deforming a plastic glass sheet from a generally two-dimensional shape into a generally three-dimensional shape, the apparatus comprising:

a vacuum-forming die having a downwardly directed die face;

conveyor means for supporting the plastic glass sheet with its two-dimensional upper face juxtaposed underneath the die face; and

means for relatively displacing the sheet and die vertically toward each other so that one portion of the sheet face engages a respective portion of the die face, for securing the two portions together by suction, and for relatively rocking the sheet and conveyor means about a horizontal axis with deformation of the sheet to press the rest of the sheet face and die face together and adhering the faces entirely together by suction.

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**4,516,998**

## METHOD OF MAKING TUBULAR VIALS AND AMPULES

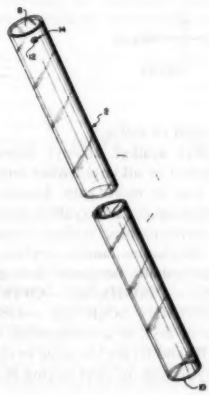
**Hans-Georg Ritt, Budenheim; Hartmut Luneberg, Mitterteich; Reinhard Mannl, Mitterteich, and Alfred Grillmeier, Mitterteich, all of Fed. Rep. of Germany, assignors to Schott-Ruhrglas GmbH, Bayreuth, Fed. Rep. of Germany**

**Filed Nov. 16, 1983, Ser. No. 552,321**

**Claims priority, application Fed. Rep. of Germany, Nov. 16, 1982, 3242326**

**Int. Cl.³ C03B** *23/12*

**U.S. Cl. 65—108** **10 Claims**



1. Production method for vials whereby vials are produced from vertically mounted glass tubes in a production machine, said method comprising:

vertically mounting a glass tube, which has both ends sealed, in a production machine,

heating a portion of the sides of the tube adjacent to the top portion of the tube,

forming a bottom portion of a vial in the vicinity of said heated portion, whereby excess pressure develops within the tube below said bottom portion causing said bottom portion to burst open immediately forming a mouth portion for a vial,

separating said top portion of the tube above said mouth portion,

separating said vial from the tube at a distance from said mouth portion corresponding to the length of said vial whereby the bottom portion of said vial and a second bottom portion for the remaining length of tube are formed simultaneously, and whereby said second bottom portion bursts open immediately as a result of excess pressure accumulated within said tube below said second bottom portion thus forming a mouth portion for said second vial, and

repeating said steps of heating, forming and separating until the glass tube has been used.

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**4,516,999**

## PROCESS FOR THE THERMAL TEMPERING OF GLASS

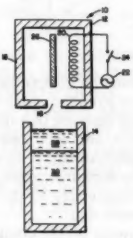
**Werner Kiefer, Mainz, and Klaus Stetter, Möhrendorf, both of Fed. Rep. of Germany, assignors to JENAer Glaswerk, Schott & Gen., Mainz, Fed. Rep. of Germany**

**Continuation of Ser. No. 226,845, Jan. 21, 1981, abandoned. This application Jun. 1, 1982, Ser. No. 383,938**

**Claims priority, application Fed. Rep. of Germany, Jan. 21, 1980, 3001944**

**Int. Cl.³ C03B** *27/02*

**U.S. Cl. 65—116** **7 Claims**



1. A process for tempering glass consisting of the steps of:

I. heating the glass to a temperature above the glass transformation temperature and below the softening temperature to produce heated glass; and then

II. passing the heated glass into a liquid of lower density; and then

III. passing the heated glass into a liquid of higher density;

wherein the residence time of the glass in the liquid of lower density is long enough such that the glass does not crack upon entering the liquid of higher density but is not so long as to completely cool the glass; and

wherein the liquid of lower density is immisible with the liquid of higher density and wherein both liquids are contained in a single vessel; and

wherein the liquid of higher density is water.

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**4,517,000**

## APPARATUS FOR PRODUCING MOLTEN GLASS

**Paul Burget, Welkenraedt, Belgium, and Michel Zortea, Chalon sur Saone, France, assignors to Saint-Gobain Vitrage, Aubervilliers, France**

**Division of Ser. No. 241,093, Mar. 6, 1981, abandoned. This application Sep. 16, 1982, Ser. No. 418,787**

**Claims priority, application France, Mar. 11, 1980, 80 05405**

**Int. Cl.³ C03B** *5/18, 5/04*

**U.S. Cl. 65—178** **9 Claims**

1. An apparatus for making molten glass from a vitrifiable composition comprising:

(a) charge-receiving means for melting the vitrifiable composition to form the molten glass;

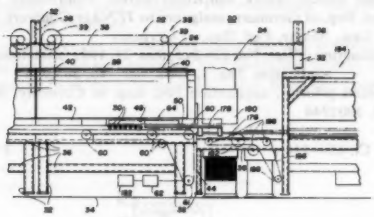
(b) means for refining the molten glass flowing from the charge-receiving means and refining means located adjacent to and being in fluid flow connection with said charge-receiving means;

(c) means for heating the molten glass in the refining means;

(d) conditioning means for homogenizing and lowering the temperature of the glass to a suitable value;

(e) means for connecting the refining means to the conditioning means; said connecting means having more narrow dimensions than said refining or conditioning means;

(f) means for feeding the molten glass in a forward current from the refining means to the conditioning means, said feeding means comprising a row of agitators being located in said connecting means in a dissymmetrical arrangement such that the row of agitators is located closer to the wall of the connecting means toward which the direction of



the agitators' rotation directs the molten glass; each agitator being spaced from the agitator which precedes it in the row by the same distance that the next agitator in the row is spaced from it, and each agitator rotating in the same direction at approximately identical speeds, and being immersed in the forward current of said molten glass in a row aligned transversely to the direction of flow in the connecting means; and

(g) means for drawing off the conditioned molten glass, said drawing off means located adjacent to and in fluid flow connection with said conditioning means.

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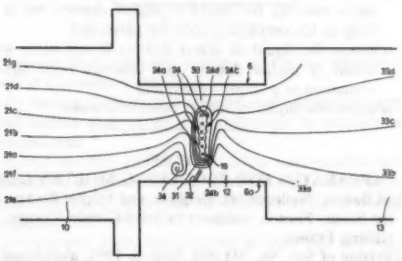
**4,517,001**

## APPARATUS FOR BENDING GLASS SHEETS

**Ronald A. McMaster, Woodville, Ohio, assignor to Glasstech, Inc., Perrysburg, Ohio**

**Filed Mar. 19, 1984, Ser. No. 590,770**
**Int. Cl.³ C03B** *23/033, 35/14*
**U.S. Cl. 65—273** **15 Claims**



1. Apparatus for bending glass sheets comprising:

a furnace for providing a heated ambient for heating glass sheets to a sufficiently high temperature for bending thereof;

a conveyor for conveying glass sheets through the heated ambient;

a holder having a downwardly facing planar surface spaced immediately above the conveyor in close proximity to a heated glass sheet conveyed under the holder;

means for applying a differential gas pressure to said heated glass sheet to provide support thereof against the holder surface;

a curved mold movable into the heated ambient to a first position at an elevation below the holder surface and thereafter movable to a second position out of the heated ambient;

means for horizontally moving the holder within the heated ambient from above the conveyor to above the mold while the mold is in the first position whereupon the differential gas pressure is terminated to release the heated glass sheet onto the mold for bending by gravity;

an actuator for moving the mold with the glass sheet thereon from the first position to the second position for cooling; and

control means for coordinating the holder moving means and the conveyor to synchronize horizontal movement of the holder within the heated ambient with the movement of the conveyed heated glass sheets.

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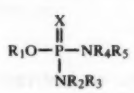
**4,517,002**

## PHOSPHORODIAMIDE UREASE INHIBITORS AND UREASE INHIBITED UREA BASED FERTILIZER COMPOSITIONS

**Louis G. Anello, Hamburg; Michael Van Der Puy, Cheektowaga; Larry L. Hendrickson, Camillus, all of N.Y.; Milorad M. Rogic, Whippany, N.J.; Michael D. Swerdloff, Parsippany, N.J., and Jaroslav F. Kolc, Randolph Township, Morris County, N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Mar. 16, 1983, Ser. No. 475,989**
**Int. Cl.³ C05C** *9/00*
**U.S. Cl. 71—28** **48 Claims**

1. A composition comprising an acceptable carrier and a urease inhibiting effective amount of one or more phosphorodiamide compounds of the formula:



wherein

X is oxygen or sulfur;

$R_1$ is alkyl, aralkyl, alkenyl, heterocycle, cycloalkyl, cycloalkenyl or alkynyl, either unsubstituted or substituted with one or more halo, heterocycle, hydroxy, alkoxy, alkylmercapto, carboxyalkyl, quaternary ammonium radical, arylmercapto, aryloxy, cyano, acyloxy, $-ONO_2$, nitro, alkylamino, amino, arylamino, dialkylamino, alkanoyl, isocyanato, isocyano, mercapto. $-SO_2OH$, $-OPO(OH)_2$, $-OB(OH)_2$ or $-OPO(OR)OH$, $-OPO(OR)_2$, $-OSO_2OR$, $-SO_2R$ and $-OSO_2R$ wherein R is aliphatic or aryl, or a combination thereof; and

$R_2$, $R_3$, $R_4$ and $R_5$ are the same or different and are individually hydrogen or alkyl having from 1 to 4 carbon atoms.

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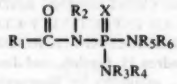
**4,517,003**

## N-ACYL PHOSPHORIC TRIAMIDE UREASE INHIBITORS AND UREASE INHIBITED UREA BASED FERTILIZER COMPOSITIONS

**Jaroslav F. Kolc, Randolph; Michael D. Swerdloff, Parsippany; Milorad M. Rogic, Whippany, all of N.J., and Larry L. Hendrickson, Camillus, N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Jun. 8, 1983, Ser. No. 502,394**
**Int. Cl.³ C05C** *9/00*
**U.S. Cl. 71—28** **52 Claims**

1. A composition comprising an acceptable carrier and a urease inhibiting effective amount of one or more phosphoric triamide compounds of the formula:



wherein:

X is oxygen or sulfur;

$R_1$ is alkyl or cycloalkyl either unsubstituted or substituted with one or more substituents selected from the group consisting of alkylamino, amino, dialkylamino, arylmercapto, alkylmercapto, isocyanato, alkoxy, nitro, halogen, mercapto, cyano, phenoxy, quaternary ammonium materials and hydroxy;

$R_2$ is hydrogen, or cycloalkyl, alkyl or phenyl either unsubstituted or substituted with one or more substituents selected from the group consisting of halo, alkyl, trihalomethyl, phenyl, cyano, alkylmercapto, mercapto, alkoxy, alkylamino, dialkylamino, amino, nitro and phenoxy; and

$R_3$, $R_4$, $R_5$ and $R_6$ are individually hydrogen or alkyl having from 1 to about 4 carbon atoms.

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**4,517,004**

## ARYL PHOSPHORIC TRIAMIDE AND ARYL PHOSPHORODIAMIDATE UREASE AND NITRIFICATION INHIBITORS AND UREASE AND NITRIFICATION INHIBITED UREA AND REDUCED NITROGEN BASED FERTILIZER COMPOSITIONS

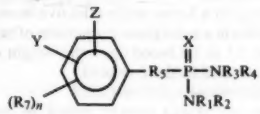
**Michael D. Swerdloff, Parsippany; Jaroslav F. Kolc, Randolph Township, Morris County; Milorad M. Rogic, Whippany, all of N.J., and Larry L. Hendrickson, Camillus, N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Jun. 8, 1983, Ser. No. 502,395**

**Int. Cl.³ C05C 9/00**

**U.S. Cl. 71—28** **35 Claims**

1. A composition comprising an acceptable carrier and a urease inhibiting effective amount of one or more compounds of the formula:



wherein:

X is oxygen or sulfur;

n is 1, 2 or 3;

Z and Y are the same or different and are hydrogen, alkyl, aryl, heterocycle, alkenyl, aralkyl, alkaryl, nitro, cyano, halogen, trihalomethyl, hydroxy, mercapto, carboxy, carbamyl, alkylmercapto, amino, dialkylamino, phenoxy, sulfonic acid, alkoxy, or Z or Y together may form an alkylene or alkenylene chain which may optionally include one or more heteroatoms of divalent oxygen, sulfur or nitrogen to form a fused or spiro aromatic, cycloaliphatic or heterocyclic ring structure;

$R_1$, $R_2$, $R_3$ and $R_4$ are the same or different and are hydrogen or alkyl having from 1 to about 4 carbon atoms;

$R_5$ is devalent oxygen or a divalent moiety of the formula:

wherein:

$R_6$ is hydrogen, or unsubstituted or substituted phenyl, cycloalkyl, or alkyl wherein permissible substituents are one or more halogen, mercapto, nitro, cyano, carboxyalkyl, amido, alkylmercapto, aryloxy, acyloxy, carboxy, amino, dialkylamino, N-diaminophosphinyl, O-diaminophosphinyl, S-diaminophosphinyl, N-(diaminophosphinyl)carbamyl, diaminophosphinyl, biscarboxyalkyl, alkylcarbonyl, hydroxy and thiocyano; and

$R_7$ is hydroxy, mercapto or a moiety of the formula:

—OM, —SM, or $—NR_8R_9$

wherein:

M is a metal cation; and

$R_8$ and $R_9$ are the same or different and are selected from the group consisting of permissible $R_6$ groups; with the proviso that at least one $R_7$ group is substituted at the ortho or para position relative to the $R_5$ group and that at least one of $R_5$ and $R_7$ contains a divalent oxygen bonded to the phenyl ring.

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**4,517,005**

## AMINOPHENOL UREASE INHIBITORS AND UREASE INHIBITED UREA BASED FERTILIZER COMPOSITIONS

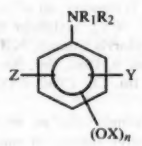
**Jaroslav F. Kolc, Randolph Township, Morris County; Michael D. Swerdloff, Parsippany; Milorad M. Rogic, Whippany, all of N.J., and Larry L. Hendrickson, Camillus, N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Jun. 8, 1983, Ser. No. 502,401**

**Int. Cl.³ C05C 9/00**

**U.S. Cl. 71—28** **34 Claims**

1. An composition comprising an acceptable carrier urease inhibiting effective amount of one or more aminophenol compounds of the formula:



and acid salts thereof,

wherein:

n is 1, 2 or 3;

X is hydrogen or a metal cation;

Z and Y are the same or different and are hydrogen, alkyl, aryl, heterocycle, nitro, cyano, halogen, trihalomethyl, carbamyl, sulfonic acid, mercapto, hydroxy, amino, alkylmercapto, alkylamino, carboxyl, dialkylamino or phenoxy; or Z and Y together may form an alkylene or alkenylene chain which may optionally include one or more heteroatoms of divalent oxygen, nitrogen, sulfur, sulfinyl or sulfonyl to form a fused or spiro aliphatic, aromatic or heterocyclic ring structure; and

$R_1$ and $R_2$ are the same or different and are hydrogen, or substituted or unsubstituted alkyl or phenyl wherein permissible substituents are one or more halogens, alkoxy, cyano, aryloxy, acyloxy, nitro, mercapto, alkylmercapto, and arylmercapto, thiocyano, amido, quaternary ammonium radical, amino, alkylamino, dialkylamino, alkylcarbonyl, arylcarbonyl, alkoxycarbonyl, carboxy, carboxyalkyl, bis-carboxyalkyl, or $R_1$ and $R_2$ together may form an alkylene chain completing a 3, 4, 5 or 6 membered ring structure or $R_1$, $R_2$ and N together may form an iminoaliphatic, iminocycloaliphatic or iminoaromatic group.

**4,517,006**

## COMPOSITE MATERIALS COMPRISING WATER-SOLUBLE GLASS PARTICLES

**Cyril F. Drake, Harlow, and Ronald Jones, Sawbridgeworth, both of England, assignors to ITT Industries, Inc., New York, N.Y.**

**Filed Nov. 17, 1982, Ser. No. 442,376**

**Claims priority, application United Kingdom, Nov. 18, 1981, 8134752**

**Int. Cl.**[3] **A01N** *25/26;* **A61K** *9/26, 9/52;* **C05B** *17/00*

**U.S. Cl. 71—64.11** **10 Claims**

1. A coherent composite structure releasably incorporating an active material therein, said composite structure comprising a polymeric matrix material and a particulate glass composition dispersed in said matrix material, said polymeric matrix material being essentially insoluble in aqueous medium and said particulate glass composition being soluble at a controlled dissolution rate in said aqueous medium whereby said composite structure shields said active material from release until contacted by said aqueous medium and when said composite structure is contacted by said aqueous medium, said particulate glass composition dissolves at a controlled rate thereby increasing the aqueous permeability of said composite structure to release said active material incorporated therein at a controlled rate, said particulate glass composition consisting essentially of from 50–75 mole percent of phosphorus pentoxide as a glass forming oxide; from 1–20 mole percent of an alkali metal oxide as the principal glass modifier, the remainder including from 1–25 mole percent of an oxide selected from the group consisting of an alkaline earth metal oxide, an oxide of a metal of Group III A of the Periodic Table, a transition metal oxide and combinations of the foregoing.

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**4,517,007**

## PHOSPHOROAMIDE UREASE INHIBITORS AND UREASE INHIBITED UREA BASED FERTILIZER COMPOSITIONS

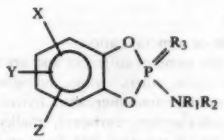
**Michael D. Swerdloff, Parsippany; Jaroslav F. Kolc, Randolph; Milorad M. Rogic, Whippany, all of N.J., and Larry L. Hendrickson, Camillus, N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Jun. 9, 1983, Ser. No. 502,439**

**Int. Cl.**[3] **C05C** *9/00*

**U.S. Cl. 71—28** **27 Claims**

1. A composition comprising an acceptable carrier and a urease inhibiting effective amount of one or more phosphoroamide compounds of the formula:




wherein:

$R_1$ and $R_2$ are the same or different and are hydrogen or alkyl having from 1 to about 4 carbon atoms;

$R_3$ is oxygen or sulfur; and

X, Y or Z are the same or different and are hydrogen, alkyl, N-diaminophosphinyl, O-diaminophosphinyl, S-diaminophosphinyl, arylamino, diarylamino, halogen, hydroxy, mercapto, alkylmercapto, diaminophosphinyl, amino, cyano, nitro, alkylamino, dialkylamino, arylmercapto, isocyano, isocyanato, trihalomethyl, alkoxy, thiocyano, alkanoyl, or any two X, Y and Z group together may form an alkylene or alkenylene chain which may optionally include one or more divalent oxygen, nitrogen, or sulfur moieties forming a 3,4,5 or 6 membered fused ring structure.

**4,517,008**

## COMPOSITIONS CONTAINING AND METHODS OF USE OF AN INFECTIVITY-CURED HR PLASMID-BEARING MICROORGANISM

**Gary A. Strobel; Andrea H. Gavlak, and Jesse M. Jaynes, all of Bozeman, Mont., assignors to Research and Development Institute, Inc. at Montana State University, Bozeman, Mont.**

**Continuation-in-part of Ser. No. 260,167, May 4, 1981, Pat. No. 4,425,150. This application Jun. 16, 1982, Ser. No. 389,070**

**The portion of the term of this patent subsequent to Jan. 10, 2001, has been disclaimed.**

**Int. Cl.**[3] **A01N** *63/00*

**U.S. Cl. 71—77** **13 Claims**

1. A method for enhancing root elongation of a germinating seed selected from the group consisting of pea, wheat, barley, corn, sorghum and soybean, which method comprises treating said seed with a root elongation enhancing amount of an infectivity-cured Hr plasmid-bearing microorganism free from pathogenicity to carrots, said microorganism being an *A. rhizogenes* $A_4$ microorganism selected from the group consisting of (a) a first microorganism type characterized by an induction of significantly enhanced shoot length in a germinating corn seed, and having the characteristics of *A. rhizogenes* $A_4$ ATCC 31798, and (b) a second microorganism type characterized by significant germination induction of Kentucky bluegrass seed and having the characteristics of *A. rhizogenes* $A_4$ ATCC 31798.

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**4,517,009**

## HERBICIDAL MIXTURES

**Fred W. Slife, Urbana, Ill., assignor to FBC Limited, Cambridge, England**

**Continuation-in-part of Ser. No. 225,099, Jan. 14, 1981, abandoned. This application Mar. 30, 1983, Ser. No. 480,576**

**Claims priority, application United Kingdom, Jan. 15, 1980, 8001228**

**Int. Cl.**[3] **A01N** *43/78*

**U.S. Cl. 71—90** **2 Claims**

1. A herbicidal composition, the active components of which consist essentially of a herbicidally-effective amount of benazolin and acifluorfen in a synergistic proportion of benazolin to acifluorfen from 2:1 to 1:2 based upon the weight of the active components expressed as the free acid.

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**4,517,010**

## 2-NITRO-5(SUBSTITUTED-PHENOXY) BENZOYL DERIVATIVES AS HERBICIDES

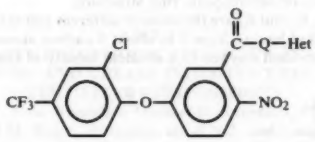
**Robert J. Theissen, Bridgewater, N.J., assignor to Rhone-Poulenc Inc., Monmouth Junction, N.J.**

**Division of Ser. No. 282,316, Jul. 10, 1981, , which is a continuation-in-part of Ser. No. 117,732, Feb. 1, 1980, abandoned. This application Apr. 15, 1983, Ser. No. 485,265**

**Int. Cl.**[3] **A01N** *43/40, 43/28;* **C07D** *339/04, 213/64*

**U.S. Cl. 71—90** **20 Claims**

1. A herbicidal compound of the formula:




wherein Q is O or S and Het is a heterocyclic ring selected from the group consisting of s-triazinyl; 2,3-dihydro-pyridazinyl; 1,2,5-thiadiazolyl; 1,3,4-thiadiazol-5-yl; 1,2-dithio-5-21; a tetrahydro-thiophene-1,1-dioxide; 2-chloro-6-pyridinyl,1,2-dihydro-1,6-dimethyl-2-oxo-4-pyridinyl with a provision that the term Q is S when Het represents 2-pyridinyl-N-oxide.

16. A method for combatting undesirable herbs which com-

prises contacting them with a herbicidally effective amount of a compound according to claim 1.

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**4,517,011**

## N-SUBSTITUTED HALOGENOACETANILIDES AND THEIR USE AS HERBICIDES

**Rudolf Thomas; Wilfried Draber, both of Wuppertal; Robert R. Schmidt, Cologne, and Ludwig Eue, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

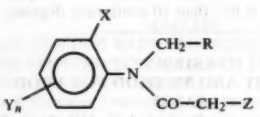
**Filed Jan. 12, 1978, Ser. No. 869,068**

**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1977, 2704281; Sep. 22, 1977, 2742583**

**Int. Cl.³ A01N** *43/50, 43/64;* **C07D** *231/12, 233/61*

**U.S. Cl. 71—92** **17 Claims**

1. An N-substituted halogenoacetanilide of the formula



(I)

in which

R represents pyrazol-1-yl or substituted pyrazol-1-yl wherein the substituent is at least one of halogen and alkyl of 1 to 4 carbon atoms,

X and Y which may be identical or different, each represent alkyl of 1 to 4 carbon atoms,

Z represents chlorine or bromine and

n represents 0, 1 or 2

and its acid addition salts.

10. A process of combating weeds which comprises applying to the weeds or to their habitat a compound according to claim 1 alone or in the form of a composition containing the same in a herbicidally effective amount in admixture with a diluent or carrier.

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**4,517,012**

## HERBICIDE COMPOSITIONS

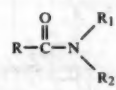
**Ferenc M. Pallos, Walnut Creek; Mervin E. Brokke, Moraga, and Duane R. Arneklev, Sunnyvale, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Division of Ser. No. 55,578, Jul. 9, 1979, Pat. No. 4,341,550, which is a division of Ser. No. 930,967, Aug. 4, 1978, Pat. No. 4,269,618, which is a continuation-in-part of Ser. No. 134,868, Apr. 16, 1971, abandoned. This application Mar. 30, 1982, Ser. No. 363,673**

**Int. Cl.³ A01N** *43/40, 37/00*

**U.S. Cl. 71—94** **22 Claims**

1. A herbicidal composition comprising an active thiolcarbamate herbicide and a non-phytotoxic antidotally effective amount of an antidote therefore corresponding to the formula



wherein R is $C_1$–$C_6$ haloalkyl and $R_1$ and $R_2$ taken together form a structure selected from piperidinyl, alkylpiperidinyl and alkyltetrahydropyridyl; said antidote compound being antidotally active with said thiolcarbamate herbicide compound wherein said compound is present in an amount varying between about 0.001 to 30 parts by weight for each part by weight of the active thiolcarbamate herbicide compound.

**4,517,013**

## CYCLOHEXANE-1,3-DIONE DERIVATIVES AND THEIR USE FOR CONTROLLING UNDESIRABLE PLANT GROWTH

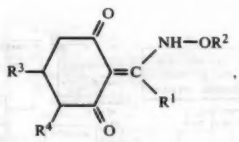
**Rainer Becker, Bad Durkheim; Dieter Jahn, Edingen-Neckarhausen; Michael Keil, Ludwigshafen; Walter Himmele, Walldorf, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jul. 21, 1983, Ser. No. 515,898**

**Int. Cl.³ A01N** *31/04, 33/24;* **C07C** *149/14*

**U.S. Cl. 71—98** **7 Claims**

1. A cyclohexane-1,3-dione derivative of the formula



(I)

where $R^1$ is $C_1$–$C_4$-alkyl, $R^2$ is $C_1$–$C_5$-alkyl, unsubstituted or halogen-substituted $C_2$–$C_5$-alkenyl or $C_2$–$C_5$-alkynyl, $R^3$ is $C_1$–$C_{10}$-alkyl, which contains 2, 3 or 4 of the hetero-atoms O and/or S and/or the groups —SO— and/or —$SO_2$— in any desired position and $R^4$ is hydrogen, cyano, methyl or —$COOR^5$, where $R^5$ is $C_1$–$C_5$-alkyl, or a salt thereof.

7. A process for combating the growth of unwanted grasses, wherein the unwanted grasses and/or the area to be kept free from the unwanted grasses are treated with a herbicidally effective amount of a cyclohexane-1,3-dione derivative of the formula I as claimed in claim 1, or a salt of a cyclohexane-1, 3-dione derivative of the formula I as claimed in claim 1.

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**4,517,014**

## METHOD OF PRODUCING AN ORE PELLET

**Marty K. Vadis, Star Rte 4, Box 91B, East, Hibbing, Minn. 55746**

**Division of Ser. No. 422,834, Sep. 24, 1982, Pat. No. 4,474,603. This application Sep. 17, 1984, Ser. No. 650,790**

**Int. Cl.³ C22B** *1/08*

**U.S. Cl. 75—3** **5 Claims**

1. An ore pellet comprising a plurality of finely ground ore particles bound together in a matrix of Gyttja.

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**4,517,015**

## STEEL REFINING METHOD

**Hideaki Inaba, Chita, and Shuzi Sakakibara, Handa, both of Japan, assignors to Daido Tokushuko Kabushiki Kaisha, Nagoya, Japan**

**Filed Feb. 13, 1984, Ser. No. 579,822**

**Claims priority, application Japan, Feb. 12, 1983, 58-21887**

**Int. Cl.³ C21C** *5/52*

**U.S. Cl. 75—12** **4 Claims**

1. In a steel refining method wherein the steel is refined in a vessel through an interfacial reaction between the molten steel and a layer of slag on the molten steel, the improvement comprising, blowing a gas consisting of an inert gas into the molten steel from the bottom of said vessel to stir the molten steel by

bubbling and, at the same time, blowing a gas consisting of an inert gas from the upper side of the vessel into a zone of the slag where movement of the slag is slow relative to other zones of the slag whereby stirring of the molten steel is enhanced thereby promoting the refining reaction.

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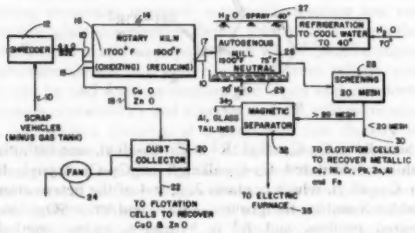
**4,517,016**

## METHOD FOR PREPARING A LOW RESIDUAL ALLOY STEEL CHARGE FROM SCRAP METAL

**Carl J. Herter, 1638 Walnut St., Allentown, Pa. 18102**

**Filed Sep. 6, 1983, Ser. No. 529,290**
**Int. Cl.³ C22B *1/00***
**U.S. Cl. 75—28** **11 Claims**




1. A method of preparing a low residual alloy for steel charge from steel and iron scrap metal containing at least one nonferrous metal selected from the group consisting of copper, nickel, lead, chromium, zinc and aluminum as contaminents comprising:

(a) introducing said scrap into a feed end of a three zone rotary or the like kiln, said zone's coexisting simultaneously in said kiln, said kiln's feed end zone having an oxidizing atmosphere and a temperature of not less than about 1650 degrees F. to oxidize zinc and copper present in said scrap to their respective oxides and producing thereby an oxide laden dust;

(b) removing said oxide laden dust from said kiln;

(c) advancing said charge from said feed end of said kiln to said kiln's midsection and therein at said kiln's midsection causing said zone atmosphere to change from said oxidizing atmosphere to a neutral atmosphere and thereafter advancing said charge from said midsection of said kiln to said kiln's exit end and therein at said kiln's exit end zone causing said atmosphere to change from said neutral atmosphere to a reducing atmosphere, and raising said kiln temperature in said area of reducing atmosphere to not less than about 1800 degrees F. to induce brittle metallic scale formation of copper, nickel, lead, chromium, zinc and wherein only aluminum forms a melt while simultaneously reducing iron oxides formed during the oxidizing step to metallic iron scale; and,

(d) mechanically separating and removing said scale from said feed to leave a ferrous based scrap metal feed with lowered nonferrous metal contamination suitable for use as a charge in a steel making furnace.

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**4,517,017**

## TEMPERATURE SENSITIVE AMORPHOUS MAGNETIC ALLOY

**Koichiro Inomata, Yokohama, and Shinichi Murata, Tokyo, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Feb. 8, 1982, Ser. No. 346,952**
**Claims priority, application Japan, Feb. 10, 1981, 56-17431**
**Int. Cl.³ C22C *33/00***
**U.S. Cl. 75—123 B** **7 Claims**

1. A temperature sensitive amorphous magnetic alloy for use in a temperature sensor, having a Curie point of not higher than 200° C., said alloy consisting essentially of a composition represented by the formula

$$(M_{1-a-b}Ni_aCrb)_{100-z}X_z$$

wherein

M represents a cobalt atom (Co) or an iron atom (Fe);

X represents at least one of a phosphorous atom (P), a boron atom (B), a carbon atom (C) and a silicon atom (Si);

a is a numeral ranging between 0.2 and 0.8 inclusive when M is Co, or a is a numeral ranging between 0.4 and 0.9 inclusive when M is Fe;

b is a numeral between 0 and 0.05; such that the sum of a and b does not exceed 0.8 when M is cobalt or 0.9 when M is iron; and

z is a numeral ranging between 15 an 30 inclusive, wherein a and z are selected such that the temperature difference between the temperature showing the maximum value of effective permeability at 10 kHz and the temperature of the Curie point is less than 10 centigrade degrees.

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**4,517,018**

## CAST IRON ALLOY AND METHOD FOR PRODUCING SAME

**Ii Tadashi, Okayama, and Egusa Saichi, Hiroshima, both of Japan, assignors to Kabushikigaisha Kyowa Chuzosho, Okayama; Yugengaisha Kyowa Chuzosho, Hiroshima; Otsuka Chemical Co., Ltd., Osaka and Ando Parachemie Co., Ltd., Tokyo, all of, Japan**

**Filed Feb. 28, 1983, Ser. No. 470,459**
**Claims priority, application Japan, Feb. 27, 1982, 57-31456**
**Int. Cl.³ C22C *33/08***
**U.S. Cl. 75—129** **15 Claims**

1. A composite cast iron alloy produced by the process comprising the steps of:

melting and reacting iron raw material and other raw materials including calcium-containing substances, coke, and titanates;

mixing aluminum metal with the melted material obtained from the foregoing step; and

casting the mixture into a composite alloy.

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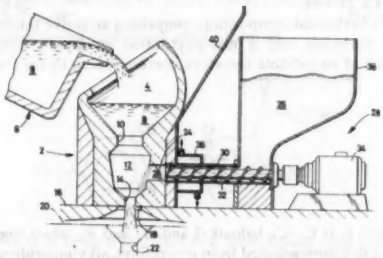
**4,517,019**

## METHOD FOR CONTINUOUSLY TREATING MOLTEN METAL

**Hirotoshi Taniguchi, 81-173, Aza-Tendoshinden, Oaza-Maehara, Inuyama-shi, Aichi-ken, Japan**

**Division of Ser. No. 522,721, Aug. 12, 1983,. This application Apr. 5, 1984, Ser. No. 597,055**
**Claims priority, application Japan, May 12, 1983, 58-82989**
**Int. Cl.³ C22C *33/08***
**U.S. Cl. 75—130 R** **5 Claims**



1. A method for continuously treating molten metal with a solid treating agent, comprising the steps of:

continuously pouring the molten metal into a treating vessel having at an upper portion thereof an inlet receiver into

which the molten metal is poured, and at a lower portion thereof an outlet passage through which the molten metal is discharged out of said treating vessel after the metal is treated, said treating vessel further having, at a portion thereof between said upper and lower portions, a reaction chamber which communicates with said inlet receiver and said outlet passage and in which the molten metal is brought into contact with the treating agent;

continuously introducing the treating agent into said treating vessel through a supply passage formed through the side wall of said treating vessel substantially perpendicularly to the direction of thickness of said side wall and communicating with said reaction chamber, for effecting a continuous contact of the molten metal with the introduced treating agent; and

discharging the molten metal from the lower portion of said treating vessel after the molten metal is treated with the treating agent in said treating vessel.

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**4,517,020**

## APPARATUS FOR RAPID BURNING OF THERMALLY PRETREATED FINE GRAINED PRODUCT AND METHOD

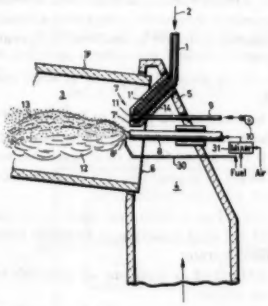
**Eberhard Steinbiss, Düsseldorf, and Horst Herchenbach, Hennef, both of Fed. Rep. of Germany, assignors to Klöckner-Humboldt-Deutz AG, Fed. Rep. of Germany**

**Filed Nov. 8, 1983, Ser. No. 549,771**

**Claims priority, application Fed. Rep. of Germany, Nov. 18, 1982, 3242508**

**Int. Cl.³ C04B** *7/02*; **D06F** *58/00*; **F27B** *15/00*, *7/32*

**U.S. Cl. 106—100** **13 Claims**




12. A method for rapid burning of a thermally pretreated, at least partially calcined fine grained product into cement clinker comprising:

dropping particles of said product at a temperature of about 800° to 900° C. with sufficient velocity against a deflector to break up agglomerates of said product and form a cloud of particles, and

directing the cloud of particles into substantially parallel relation to a flame at a temperature sufficient to provide extremely high heating gradients and complete the sintering of said particles at a temperature of at least 1250° C.

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**4,517,021**

## SEMI-CRYSTALLINE FRUCTOSE

**Charles E. Schollmeier, Decatur, Ill., assignor to A. E. Staley Manufacturing Company, Decatur, Ill.**

**Filed Oct. 28, 1983, Ser. No. 546,348**

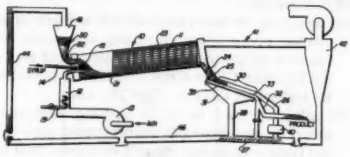
**Int. Cl.³ C13K** *11/00*

**U.S. Cl. 127—30** **10 Claims**

1. A process for preparing free-flowing, granular, semi-crystalline, solid fructose which comprises:

(a) combining together an aqueous fructose syrup comprising about 60 to 93 weight percent saccharide, about 85 to 100 weight percent of the saccharide being fructose, and a solid crystallization initiator in a weight ratio of crystallization initiator to fructose syrup of about 5:1 to 40:1;

(b) contacting the combined fructose syrup and crystallization initiator with air having an initial temperature of about 50° to 80° C. and a final relative humidity of less than about 20 percent for a period of time of about 12 to 48 hours to transform the combined fructose syrup and crystallization initiator to a free-flowing, granular, solid fructose product comprising less than about 2 weight percent water and greater than about 60 weight percent crystalline fructose; and



(c) recovering the free-flowing, granular, semi-crystalline, solid fructose product.

9. A free-flowing, granular, semi-crystalline, solid fructose composition which consists essentially of:

(a) less than about 2 weight percent water;

(b) greater than about 60 weight percent crystalline fructose;

(c) less than about 35 weight percent amorphous fructose;

(d) about 2 to 8 weight percent glucose; and

(e) about 2 to 8 weight percent polysaccharides distributed predominantly at or on the surface of the granules such that the hygroscopicity of the granule is reduced from that of a granule having a uniform distribution of polysaccharides.

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**4,517,022**

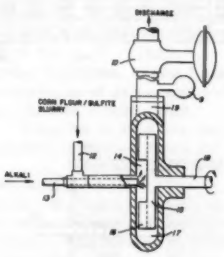
## STARCH PRODUCTION FROM CORN

**Richard D. Harvey, Muscatine, Iowa, assignor to Grain Processing Corporation, Muscatine, Iowa**

**Continuation of Ser. No. 338,363, Jan. 11, 1982, abandoned. This application Oct. 17, 1983, Ser. No. 530,747**

**Int. Cl.³ C13L** *1/00*

**U.S. Cl. 127—68** **3 Claims**




1. A process for producing granular starch which consists essentially of mixing for a period of not more than 4 hours at ambient temperature dehulled and degermed corn containing starch and protein with water to form an aqueous slurry, treating said aqueous slurry with alkali, subjecting the alkali containing slurry to high intensity mixing and then recovering granular starch from which at least 75% of the original protein content has been separated.

**4,517,023**

## RUST REMOVAL PROCESS USING REMOVABLE COATINGS OF MALEIC ACID COPOLYMERS

**Eugene S. Barabas, Watchung, N.J., assignor to GAF Corporation, Wayne, N.J.**

**Division of Ser. No. 454,127, Dec. 29, 1982, Pat. No. 4,451,296, which is a continuation-in-part of Ser. No. 364,000, Mar. 31, 1982, Pat. No. 4,424,079. This application May 22, 1984, Ser. No. 612,777**

**The portion of the term of this patent subsequent to Jan. 3, 2001, has been disclaimed.**

**Int. Cl.³ B08B** *7/00;* **C11D** *3/37, 7/26;* **C23G** *5/00*

**U.S. Cl. 134—4** **7 Claims**

1. Process for removing rust from a rusty metal surface which comprises:

(a) applying to said rusty surface a layer of rust removal coating composition consisting essentially of an aqueous solution of a copolymer of maleic acid and monomer of the formula $CH_2{=}CHR$ wherein R represents $OR^1$ and $R^1$ represents $CH_3$ or $CH_2CH_3$; and

(b) allowing said layer of coating composition to dry whereby rust becomes incorporated into said layer and the layer containing the rust detaches itself from the surface.

3. Process according to claim **1** wherein:

(a) the coating composition consists essentially of between about 5 and about 60 wt % of said copolymer and between about 40 and about 95 wt % water;

(b) the coating composition is applied to the rusty surface to form a layer between about 0.01 and about 20 mm thick;

(c) the coating composition has a viscosity between about 50 and about 250,000 cps; and

(d) the applied coating composition is allowed to dry for between about 0.5 and about 8 hours whereby the rust becomes incorporated into the layer of coating composition and the layer becomes detached from the metal surface.

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**4,517,024**

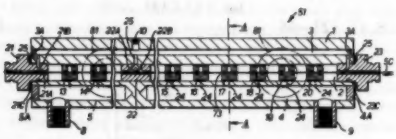
## SCOURING OF ELONGATE MATERIAL AND APPARATUS THEREFOR

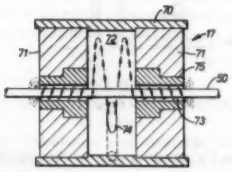
**Robert P. Gough, 3 Hopstone Gardens Penn., Wolverhampton, England**

**Filed Jul. 13, 1982, Ser. No. 398,850**

**Int. Cl.³ B08B** *3/10*

**U.S. Cl. 134—15** **9 Claims**





1. A device for scouring the surface of elongate material including

a primary generally cylindrical chamber having at least one substantially tangentially directed inlet for fluid and

a pair of secondary generally cylindrical chambers which are axially aligned with, and on opposite sides of the primary chamber, and each having a substantially smaller radius than the primary chamber, the primary and secondary chambers being arranged to allow elongate material to be passed axially through them and the secondary chambers forming outlets for fluid from the primary chamber,

the primary chamber consisting of a tube and a pair of annular end caps fitted to the tube, the end caps also defining the secondary chambers,

the arrangement being such that when the device is in use fluid forced into the primary chamber via the inlet forms a rotating body of fluid in the chambers, the angular velocity of which increases as the radius of rotation decreases when the fluid passes in opposite directions relative to the length of the material into the respective secondary chambers so that the elongate material is scoured and the fluid escapes from the said secondary chambers.

2. A method of scouring elongate material including the step of passing the elongated material axially through a device as claimed in claim **1** while forcing a liquid into the primary chamber of said device and allowing said liquid to escape from the secondary chambers thereof.

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**4,517,025**

## METHOD FOR REMOVING SEALANT CONTAMINATION

**Stuart E. Plante, Abington, and Susan V. Hess, Norristown, both of Pa., assignors to Amchem Products, Inc., Ambler, Pa.**

**Filed May 17, 1982, Ser. No. 379,108**

**Int. Cl.³ B08B** *3/08*

**U.S. Cl. 134—38** **10 Claims**

1. A process for removing a sealant containing a resin, a heavy blending oil, a fixotrope, and a filler from a water-insoluble surface contaminated therewith comprising contacting said surface with an aqueous solution at ambient temperature consisting essentially of

(a) from about 0.8 to about 150 g/l of at least one $C_5$–$C_9$ alkanoic acid;

(b) from about 6 to about 130 g/l of at least one of an alkali metal phosphate and a condensed phosphate salt;

(c) from about 0.1 to about 50 g/l of at least one surfactant;

(d) 0 to about 130 g/l of at least one of a phosphonic acid and a sulfonic acid;

(e) 0 to about 130 g/l of at least one alkali metal silicate;

(f) 0 to about 125 g/l of at least one of an alkali metal borate and a condensed borate;

(g) 0 to about 200 g/l of at least one of an alkali metal hydroxide and an amine;

(h) 0 to a quantity of at least one of a $C_1$–$C_3$ alkanol and a $C_2$–$C_3$ glycol sufficient to solubilize component (a);

(i) 0 to about 150 g/l of a biocide; and, optionally,

(j) a small quantity of at least one of a thickening agent, a water soluble dye, and a perfume.

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**4,517,026**

## METHOD OF BACKSIDE HEATING A SEMICONDUCTOR SUBSTRATE IN AN EVACUATED CHAMBER BY DIRECTED MICROWAVES FOR VACUUM TREATING AND HEATING A SEMICONDUCTOR SUBSTRATE

**Minoru Inoue, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Apr. 8, 1983, Ser. No. 483,131**

**Claims priority, application Japan, Apr. 9, 1982, 57-059895**

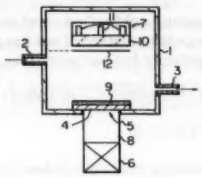
**Int. Cl.³ H01L** *21/263;* **H05B** *9/03, 9/80*

**U.S. Cl. 148—1.5** **2 Claims**

1. A method of heating a semiconductor substrate, having a back and a surface to be treated, under a reduced pressure within a vacuum treating chamber having a window which is pervious to microwaves, comprising the steps of:

(a) arranging the semiconductor substrate so as to expose the surface to be treated to the inside space of the vacuum treat-

ing chamber and to cover the window pervious to microwaves with the back of the semiconductor substrate; and



(b) irradiating the semiconductor substrate with microwaves through the window pervious to microwaves so that the microwaves heat only the substrate.

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**4,517,027**

## BULK PRODUCTION OF ALLOYS BY DEPOSITION FROM THE VAPOR PHASE AND APPARATUS THEREFOR

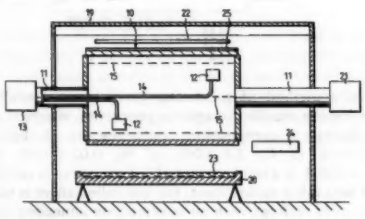
**Robert L. Bickerdike, Alton, and Garyth Hughes, Farnham, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, Great Britain**

**Filed Dec. 15, 1981, Ser. No. 331,084**

**Claims priority, application United Kingdom, Dec. 16, 1980, 8040242**

**Int. Cl.³ C23C** *13/00, 11/00*

**U.S. Cl. 148—6.3** **12 Claims**



1. A reusable collector for use in a process for the production of an alloy layer by deposition thereof from the vapour phase, the collector comprising:

a thin outer cylindrical skin having an outer surface which defines a deposition surface;

a main drum structure comprising a plurality of axial bars arranged to accommodate thermal and/or mechanical stresses;

resilient support means axially and adjustably carrying said axial bars;

an alloy between said main drum structure and said outer cylindrical skin, wherein

said alloy consists of a solder alloy having a melting temperature at which the onset of fusion occurs above the peak operating temperature at said deposition surface, said alloy being meltable upon completion of deposition from the vapour phase to detach said deposited alloy layer and said outer cylindrical outer skin from said main drum structure.

**4,517,028**

## TREATMENT OF METAL WITH DERIVATIVE OF POLY-ALKENYLPHENOL

**Andreas Lindert, Troy, Mich., assignor to Parker Chemical Company, Madison Heights, Mich.**

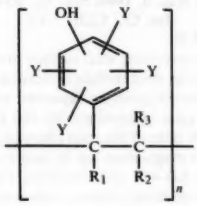
**Continuation-in-part of Ser. No. 366,449, Apr. 7, 1982, Pat. No. 4,433,015. This application May 9, 1983, Ser. No. 490,579**

**The portion of the term of this patent subsequent to Feb. 21, 2001, has been disclaimed.**

**Int. Cl.³ C23C** *1/10;* **C23F** *5/02, 11/00;* **C09K** *3/00*

**U.S. Cl. 148—6.14 R** **22 Claims**

1. The process of treating a metal surface comprising contacting the metal surface with a solution comprising an effective amount of a soluble or dispersible compound selected from the group consisting of a polymer having the following general formula, acid salts thereof and mixtures thereof:

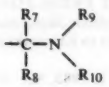


where:

$R_1$ through $R_3$ are hydrogen or an alkyl group having from 1 to about 5 carbon atoms;

each Y is hydrogen, Z, $CR_4R_5OR_6$, $CH_2Cl$, or an alkyl or aryl group having from 1 to 18 carbon atoms;

Z is



$R_4$ through $R_{10}$ are hydrogen, or an alkyl, aryl, hydroxyalkyl, amino-alkyl, mercapto-alkyl or phospho-alkyl moiety, said $R_4$ through $R_{10}$ being of carbon chain lengths up to a length at which the compound is not soluble or dispersible; and

n is from 2 up to a number at which the polymer is not soluble or dispersible.

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**4,517,029**

## PROCESS FOR THE COLD FORMING OF IRON AND STEEL

**Sakae Sonoda, Yokohama; Yoshio Nagae, Ayase, and Seishi Kano, Ichikawa, all of Japan, assignors to Parker Chemical Company, Madison Heights, Mich.**

**Filed Jun. 3, 1983, Ser. No. 500,713**

**Claims priority, application Japan, Jun. 4, 1982, 57-94686**

**Int. Cl.³ C23F** *7/10*

**U.S. Cl. 148—6.15 Z** **3 Claims**

1. In a process for treating iron and steel articles to form, on the surface thereof, a lubricant coating suitable for providing lubricity during a cold forming operation by first forming a phosphate film on the surface of the iron and steel articles and, thereafter, forming a coating of a soap-type lubricant on the phosphate film, the improvement which comprises forming the phosphate film by treating the article with an aqueous phosphatizing solution comprising from about 0.1 to about 0.35% by weight calcium ions, from about 0.1 to about 1.5% by weight zinc ions, from about 0.5 to about 3.0% by weight $PO_4$ and from about 3.0 to about 5.0% by weight nitrate ions, which solution has a weight ratio of calcium ions: zinc ions of about 0.1–1.0:1 and weight ratio of nitrate ions: $PO_4$ of about

1.0–5.0:1, to form a zinc phosphate film which contains from about 5 to about 80% by weight of the total phosphate film of zinc calcium phosphate and thereafter contacting the phosphate film with an aqueous reactive alkali metal soap composition which reacts to form a coating thereon followed by drying.

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**4,517,030**

## PROCESS FOR ACTIVATING STEEL SURFACE PRIOR TO PHOSPHATING TREATMENT AQUEOUS ACTIVATING SOLUTION THEREFOR

**Tsukasa Yamamoto; Asao Mochizuki, both of Toyota; Hiroshi Okita, Nihonbashi; Toshi Miyawaki, Nihonbashi; Yoshiji Shirogane, Nihonbashi, and Kazuhiko Mori, Nihonbashi, all of Japan, assignors to Toyota Motor Corp. and Nihon Parkerizing Co., both of, Japan**

**Filed Aug. 6, 1984, Ser. No. 637,755**
**Int. Cl.³ C23F 7/10**
**U.S. Cl. 148—6.15 R** **11 Claims**

1. A process for activating steel surface prior to phosphating treatment wherein the steel surface is cleaned, the cleaned steel surface is then treated with an aqueous activating solution comprising 3–100 ppm of titanium, 60–360 ppm of pyrophosphate ion, 150–3000 ppm of the total phosphate ion as $PO_4$, and 0.4–1.1 molar ratio magnesium ion to said pyrophosphate ion, and with a pH of 8.0–9.5, and thereafter the steel surface is treated with a phosphating solution, wherein said magnesium ion is included in said aqueous activating solution in order to suppress formation of an inactive film on said steel surface due to the presence of said pyrophosphate ion.

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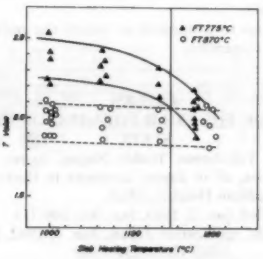
**4,517,031**

## METHOD OF MANUFACTURING COLD ROLLED STEEL SHEETS FOR EXTRA DEEP DRAWING WITH AN EXCELLENT PRESS FORMABILITY

**Junsuke Takasaki; Hirotake Sato, and Akira Yasuda, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan**

**Filed Nov. 8, 1983, Ser. No. 549,781**
**Claims priority, application Japan, Nov. 12, 1982, 57-197766**
**Int. Cl.³ C21D 8/04**
**U.S. Cl. 148—12 C** **2 Claims**




1. A method of manufacturing cold rolled steel sheets for extra deep drawing with an excellent press formability, which comprises the steps of:

melting a steel material containing not more than 0.0060% by weight of C, 0.01 to less than 0.10% by weight of Mn, 0.005–0.10% by weight of Al and Ti corresponding to Ti(%) represented by the following equation (1) when an effective Ti amount expressed by Ti* in the equation (1) satisfies the following ineqality (2);

continuously casting the resulting molten steel to produce a cast slab;

hot rolling the resulting cast slab immediately or after the slab is heated at a temperature of 900°–1,150° C., during which a hot finishing temperature is made to a temperature of not more than 780° C.;

cold rolling the resulting hot rolled sheet in the usual manner; and

subjecting the resulting cold rolled sheet to a recrystallization annealing at a temperature of not less than the recrystallization temperature but not more than 1,000° C.;

$$Ti^*(\%)=Ti(\%)-(48/14)N(\%)-(48/32)S(\%) \quad (1)$$

$$4.0\times C(\%)\leqq Ti^*(\%)\leqq 0.10 \quad (2)$$

whereby the resulting cold rolled sheet has an $\bar{r}$ value of $\geqq 2.0$.

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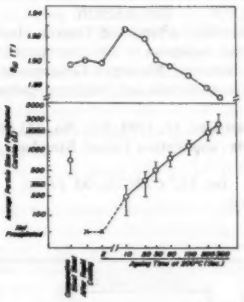
**4,517,032**

## METHOD OF PRODUCING GRAIN-ORIENTED SILICON STEEL SHEETS HAVING EXCELLENT MAGNETIC PROPERTIES

**Tomomichi Goto, Kobe; Katsuo Iwamoto, Kakogawa; Yoshinori Kobayashi, Takarazuka, and Isao Matoba, Kobe, all of Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan**

**Filed Mar. 11, 1983, Ser. No. 474,556**
**Claims priority, application Japan, Mar. 15, 1982, 57-39557**
**Int. Cl.³ H01F 1/04**
**U.S. Cl. 148—111** **4 Claims**



1. In a method of producing grain-oriented silicon steel sheets having excellent magnetic properties, wherein a silicon steel having a composition containing, in % by weight, 0.02–0.10% of C, 2.5–4.0% of Si, 0.02–0.15% of Mn, 0.008–0.080% in a total amount of at least one of S and Se is hot rolled into a hot rolled sheet, the hot rolled sheet is subjected to two cold rollings with an intermediate annealing at a temperature of 770°–1,100° C. between them, wherein the final cold rolling is carried out at a reduction rate of 40–80%, to produce a finally cold rolled sheet having a final gauge, and the finally cold rolled sheet is subjected to a decarburization annealing and then to a final annealing, an improvement comprising cooling rapidly from 770° C. to 100° C. within 30 seconds the steel sheet heated in the intermediate annealing, immediately subjecting the rapidly cooled sheet to an ageing treatment at a temperature of 150°–250° C. for 2–60 seconds to precipitate carbide particles having a very fine size of substantially 100–500 Å in a fully dispersed state in the crystal grains of the steel sheet, and then subjecting the steel sheet to the final cold rolling.

2. In a method of producing grain-oriented silicon steel sheets having excellent magnetic properties, wherein a silicon steel having a composition containing, in % by weight, 0.02–0.10% of C, 2.5–4.0% of Si, 0.02–0.15% of Mn, 0.008–0.080% in a total amount of at least one of S and Se is hot rolled into a hot rolled sheet, the hot rolled sheet is subjected to two cold rollings with an intermediate annealing at a temperature of 770°–1,100° C. between them, wherein the final cold rolling is carried out at a reduction rate of 40–80%, to

produce a finally cold rolled sheet having a final gauge, and the finally cold rolled sheet is subjected to a decarburization annealing and then to a final annealing, an improvement comprising cooling rapidly from 770° C. to 300° C. within 20 seconds the steel sheet heated in the intermediate annealing, cooling the rapidly cooled sheet from 300° C. to 150° C. in 8–30 seconds to precipitate carbide particles having a very fine size of substantially 100–500 Å in a fully dispersed state in the crystal grains of the steel sheet, and then subjecting the steel sheet to the final cold rolling.

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**4,517,033**

## CONTACT MATERIAL FOR VACUUM CIRCUIT BREAKER

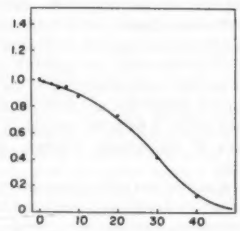
**Mitsuhiro Okumura, Sakai; Eizo Naya, Ibaragi, and Michinosuke Demizu, Takarazuka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 31, 1983, Ser. No. 547,218**

**Claims priority, application Japan, Nov. 1, 1982, 57-192785; Apr. 28, 1983, 58-76615; Apr. 28, 1983, 58-76616; Apr. 28, 1983, 58-76617**

**Int. Cl.³ C22C *9/00, 30/02***

**U.S. Cl. 148—432** **20 Claims**




1. A contact material for a vacuum circuit breaker which consists essentially of copper as the basic component, and, as the other component, an amount of chromium between 0.0 and up to 35% weight and an amount of tantalum between 0.0 and up to 50% weight, the total quantity of chromium and tantalum in said contact material being 10% by weight and above.

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**4,517,034**

## STRIP CAST ALUMINUM ALLOY SUITABLE FOR CAN MAKING

**Harish D. Merchant, Fairfield, Conn., and Edgar Lossack, Bonn, Fed. Rep. of Germany, assignors to Continental Can Company, Stamford, Conn.**

**Continuation-in-part of Ser. No. 398,734, Jul. 15, 1982, abandoned. This application Apr. 8, 1983, Ser. No. 483,337**

**Int. Cl.³ C22F *1/04***

**U.S. Cl. 148—439** **14 Claims**

13. An aluminum alloy sheet fabricated from a continuous strip cast aluminum alloy having a thickness of up to one inch, said sheet having a thickness of 0.008 to 0.017 inch that has received a reduction in thickness of at least 50% by cold rolling to provide a hard temper, the alloy being comprised of about 0.5 to about 1.5% by weight magnesium, about 0.5 to 1.5% by weight manganese, about 0.1 to about 1.0% by weight iron, about 0.1 to about 0.5% by weight silicon, about 0.0 to about 0.25% by weight zinc, about 0.0 to about 0.25% by weight copper and about 0.1 to about 0.4% by weight chromium the balance being aluminum.

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**4,517,035**

## METHOD OF MAKING A CASTABLE PROPELLANT

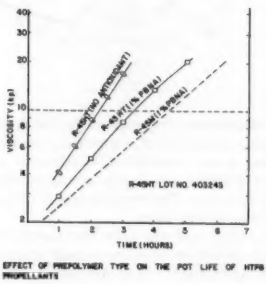
**Gonzague L. Duchesne, and Guy Perrault, both of Ste-Foy, Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada**

**Division of Ser. No. 213,670, Dec. 5, 1980, abandoned, which is a continuation of Ser. No. 888,542, Mar. 21, 1978, Pat. No. 4,427,468, which is a continuation-in-part of Ser. No. 803,992, Jun. 6, 1977, abandoned, which is a continuation-in-part of Ser. No. 663,214, Mar. 3, 1976, abandoned. This application Feb. 3, 1984, Ser. No. 575,727**

**Claims priority, application Canada, Jan. 16, 1976, 243659; Norway, Jan. 4, 1977, 770011; Canada, Dec. 13, 1977, 292954**

**Int. Cl.³ C06B *45/10***

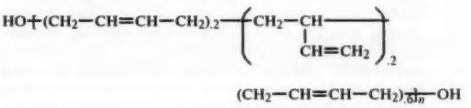
**U.S. Cl. 149—19.92** **8 Claims**




EFFECT OF PREPOLYMER TYPE ON THE POT LIFE OF HTPB PROPELLANTS

1. A method for the manufacture of a castable propellant which comprises:

(a) mixing together at atmospheric pressure liquid ingredients comprising a hydroxy-terminated butadiene polymer of the structural formula:




wherein n=57–65,

a plasticizer, a bonding agent comprising an aziridine polyester, which is the reaction product of an aziridinyl phosphine oxide and a polycarboxylic acid, and an amine polyester, which is the reaction product of an alkalolamine and a saturated aliphatic polycarboxylic acid, and an antioxidant comprising by weight 25%–75% of di-tert-butylhydroquinone in conjunction with 75%–25% of one of N-phenyl-N'-(1,3-dimethylbutyl)-p-phenylene-diamine and N-phenyl-N'-cyclohexyl-p-phenylene-diamine, the amount of antioxidant being about 1% by weight of the polybutadiene polymer,

(b) adding solid ingredients comprising finely-divided aluminum, ferric oxide as a burning rate catalyst and ammonium perchlorate oxidizer in an amount of about 75% by weight of the total amount of such oxidizer required, and mixing to give a substantially even dispersion,

(c) heating the mixture at approximately 60° C. under vacuum for about 1 hour,

(d) releasing the vacuum,

(e) adding and mixing in the remainder of the ammonium perchlorate oxidizer and a diisocyanate curing agent,

(f) reapplying vacuum and heating to about 60° C. for about 45 minutes, and

(g) casting the resulting mixture in molds under vacuum.

**4,517,036**

## MAKING OF PRINTING PLATES

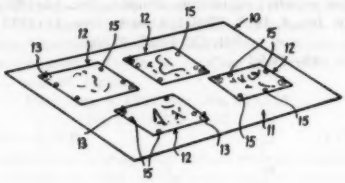
**John H. Elworthy, Bedfordshire, and Donald Mayston, Suffolk, both of England, assignors to Protocol Engineering Limited, Berkhamsted, England**

**Continuation of Ser. No. 281,274, Jul. 8, 1981, abandoned. This application Aug. 29, 1983, Ser. No. 527,204**

**Claims priority, application United Kingdom, Jul. 11, 1980, 8022763**

**Int. Cl.³ B32B *31/20***

**U.S. Cl. 156—64** **14 Claims**



1. A method of assembling a montage, for example in making a printing plate, said method comprising the steps of:

(1) applying a dry heat-sensitive adhesive coating which does not exihibit any tacky characteristics at ambient temperatures even if pressure is applied theeto to one face surface of a carrier sheet,

(2) positioning at least one sheet-like member on said carrier sheet face surface in a predetermined register position and in overlying relation to said adhesive coating to provide a montage, and

(3) applying localized heating to the montage at any desired locations where said sheet-like member is positioned at selected localized areas, said localized heating having a temperature sufficient to melt at such localized areas only said adhesive coating without damage to said sheet-like member or to said carrier sheet, whereby to provide a montage in which said sheet-like member is bonded by solid, dry adhesive bonds to said carrier sheet at said localized areas only and in which any area of said adhesive coating which is not covered by said sheet-like member remains dry and still exhibit said non-tacky characteristics, and whereby said solid dry bonds are breakable to permit said sheet-like member to be removed without heating from said carrier sheet leaving said dry adhesive coating substantially intact thereon at said localized areas.

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**4,517,037**

## REFRACTORY COMPOSITION COMPRISING NITRIDE FILLER AND COLLOIDAL SOL BINDER

**Thomas L. Francis, Murrysville, and Frankie E. Phelps, Lower Burrell, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 316,810, Nov. 2, 1981, abandoned. This application Mar. 13, 1984, Ser. No. 589,138**

**Int. Cl.³ C04B *35/58***

**U.S. Cl. 156—89** **17 Claims**

1. A refractory composition having high resistance to corrosion by molten metal chlorides and chlorine gas at elevated temperatures, said composition comprising

(a) about 100 parts by weight of a nitride refractory filler selected from the group consisting of nitrides of silicon, aluminum, titanium, chromium, hafnium, zirconium, beryllium, magnesium, manganese, iron, scandium, yttrium and rare earth elements; silicon oxynitride; aluminum oxynitride; and silicon aluminum oxynitride wherein the aluminum and oxygen are in a solid solution of silicon nitride;

(b) about 30 to 100 parts by weight of a colloidal sol binder selected from the group consisting of silica, silicon aluminum oxynitride wherein the aluminum and oxygen are in a solid solution of silicon nitride, silicon oxynitride, silicon nitride, aluminum nitride, boron nitride and alumina, all in colloidal sol form, said binder comprising an aqueous suspension containing up to about 50 wt.% solids, the quantity of binder and the concentration of binder solids being sufficient to coat substantially all of the filler and to form a plastic mixture with the filler; and

(c) less than about 2 parts by weight of the oxides or hydroxides of magnesium, calcium, chromium and manganese.

14. A method for joining refractory bricks comprising the steps of:

(a) preparing a mortar mix comprising:

(i) about 100 parts by weight of a particulate nitride refractory filler selected from the group consisting of nitrides of silicon, aluminum, titanium, chromium, hafnium, zirconium, beryllium, magnesium, and manganese, iron, scandium, yttrium and rare earth elements; silicon oxynitride; aluminum oxynitride and silicon aluminum oxynitride wherein the aluminum and oxygen are in a solid solution of silicon nitride, substantially all of said particulate filler passing through a 48 mesh screen (Tyler Series);

(ii) about 30 to 100 parts by weight, based on the weight of the filler, of a colloidal sol binder and the concentration of binder solids selected from the group consisting of silica, silicon aluminum oxynitride. wherein the aluminum and oxygen are in a solid solution of silicon nitride, silicon nitride, silicon oxynitride, aluminum nitride, boron nitride and alumina, all in colloidal sol form, said binder comprising an aqueous suspension containing up to about 50 wt.% solids, the quantity of binder being sufficient to coat substantially all of the filler particles and to form a plastic mixture with the filler; and

(iii) less than about 2 parts by weight of the oxides or hydroxides of magnesium, calcium, chromium and manganese;

(b) applying the mortar mix to form a seam between a pair of opposed refractory bricks, said seam and bricks comprising, in combination, a refractory assembly; and

(c) firing the refractory assembly at an elevated temperature of about 700° to 800° C.

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**4,517,038**

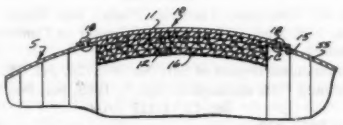
## METHOD OF REPAIRING BALLISTIC DAMAGE

**Robert W. Miller, 1235 - 19th St., Hermosa Beach, Calif. 90254**

**Continuation-in-part of Ser. No. 493,323, May 10, 1983,. This application Nov. 21, 1983, Ser. No. 553,575**

**Int. Cl.³ B32B *35/00***

**U.S. Cl. 156—98** **4 Claims**



1. A method for making repairs in a stressed panel, comprising the steps of:

cutting out preselected openings in said panel;

selecting a patch assembly having an exterior metal skin larger than said opening adhered to a stack of filament layers of a plan form substantially equal to said opening;

bending said skin to match the surface of said panel adjacent said opening;

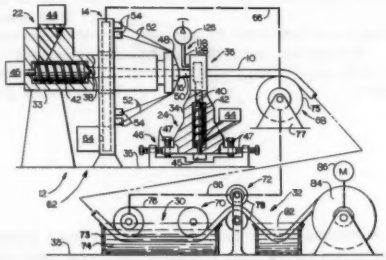
coating said filament layers with resin; and

attaching said patch assembly to the edges of said opening.

## 4,517,039
## METHOD AND APPARATUS FOR MAKING BRAIDED REINFORCED HOSE

Ronald L. Satzler, Princeville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 29, 1983, Ser. No. 509,110
The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.
Int. Cl.[3] B29D *23/05;* B65H *81/00*
U.S. Cl. 156—149 11 Claims



1. A method of manufacturing a reinforced elastomeric hose (10), comprising the steps of:

braiding a tubular reinforcement member (16) on a tapered mandrel (50) at a first braid angle, said reinforcement member (16) having inner and outer surfaces (18, 20);

progressively pushing the reinforcement member (16) from the mandrel (50) in response to the braiding action;

extruding and forming an elastomeric liner (26) from a first extruder (33) onto the inner surface (18) of the braided reinforcement member (16) after it leaves the mandrel;

extruding and forming an elastomeric cover (28) from a second extruder (34) onto the outer surface (20) of the braided reinforcement member (16), said extruding of the elastomeric liner (26) and cover (28) occurring at approximately the same axial location and adjacent the mandrel (50);

progressively curing the elastomeric hose (10) after exiting the extruders (33,34);

changing the braid angle of the reinforcement member (16) to a predetermined braid angle smaller than an optimum braid angle by pulling the elastomeric hose (10) after it exits the second extruder through the curing apparatus (30) at a linear rate fastener than the rate of extruding the hose (10); and

obtaining the predetermined optimum braid angle by releasing the pulling force on the elastomeric hose (10) after curing to free the braids of the reinforcement member (16) to rebound to the predetermined optimum braid angle.

3. An apparatus (12) for forming an elastomeric reinforced hose (10), comprising:

a tapered mandrel (50) having an end portion (92);

a braiding machine (14) adapted to continuously braid a reinforcement member (16) on the tapered mandrel (50) and progressively push the reinforcement member (16) from the tapered mandrel (50) by the braiding action, the reinforcement member (16) having inner and outer surfaces (18,20);

first means (22) for extruding an elastomeric liner (26) onto the inner surface (18) of the reinforcement member (16) as it is being pushed from the mandrel by the braiding action;

second means (24) for extruding an elastomeric cover (28) onto the outer surface (20) of the reinforcement member (16), said liner (26) and cover (28) being extruded at approximately the same axial location and adjacent the end portion (92) of the tapered mandrel (50);

curing means (30) for curing the hose (10) after the hose exits the extruders (33,34); and

haul-off means (32) for continuously pulling the hose after it exits the second extruder through the curing means at a linear rate faster than the rate of extruding the hose (10) to change the braid angle to a braid angle smaller than an optimum braid angle and releasing the pulling force on the hose after curing to free the braids of the reinforcement member (16) to rebound so that the optimum braid angle is achieved.

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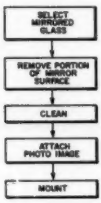
## 4,517,040
## METHOD OF MAKING A DECORATIVE PHOTO MIRROR

Linda J. Whitted, 728 E. Michigan Ave. #134, Orlando, Fla. 32806

Filed Jan. 16, 1984, Ser. No. 571,112
Int. Cl.[3] B32B *31/22*
U.S. Cl. 156—153 6 Claims




1. A method of making a decorative photo mirror apparatus comprising the step of:

cutting a glass mirror to a predetermined size and shape;

removing a portion of the mirrored surface in a vignetted pattern, said removing a portion of the mirrored surface including applying a paint remover with an abrasive material for removing the mirrored surface;

cleaning the mirror to remove residue chemicals from the mirrored surface;

attaching an image over the glass portion having the mirrored surface removed; and

mounting the mirror and image for display, whereby a decorative photo mirror is formed and mounted.

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## 4,517,041
## METHOD FOR ATTACHING A WORKPIECE TO A WORKPIECE CARRIER

Douglas J. Hennenfent, New Hope; Allan L. Holmstrand, Bloomington, and Alan G. Kracke, Minnetonka, all of Minn., assignors to Magnetic Peripherals Inc., Minneapolis, Minn.

Division of Ser. No. 430,195, Sep. 30, 1982, Pat. No. 4,457,114.
This application Jun. 27, 1984, Ser. No. 600,266
Int. Cl.[3] B32B *31/24*
U.S. Cl. 156—155 5 Claims

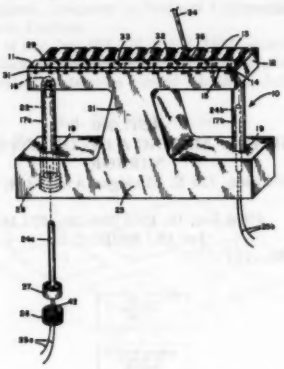
1. In a method for mounting on a workpiece carrier a relatively thin, elongate workpiece having an elongate, flat surface, said workpiece carrier having a support surface which may be elastically bent into a more concave shape responsive to power input to the workpiece carrier, an improvement for creating a convex bend in the workpiece, including the steps of

(a) supporting the carrier with the support surface facing upwardly; then

(b) supplying power at a predetermined rate to the workpiece carrier, thereby causing said support surface to assume a predetermined more concave shape;

(c) laying the workpiece, flat surface down, on the support surface; then

(d) bonding the workpiece along its flat surface to the support surface; and then



(e) reducing the rate of power supplied to the workpiece carrier, whereby the support surface elastically returns to a less concave shape.

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**4,517,042**

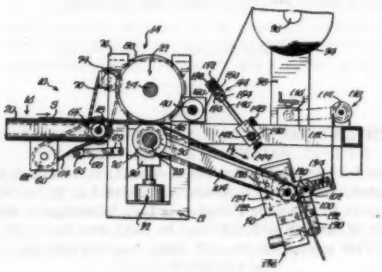
## METHOD AND APPARATUS FOR DECURLING LAMINATED STOCK

**Karl Singer, Palatine, Ill., assignor to D&K Custom Machine Design, Inc., Elk Grove Village, Ill.**

**Continuation-in-part of Ser. No. 429,616, Sep. 30, 1982, Pat. No. 4,470,589. This application May 14, 1984, Ser. No. 609,776**

**Int. Cl.**[3] **B65H** *3/02*

**U.S. Cl. 156—164** **16 Claims**



1. A method of laminating a flexible film to a discrete article comprising feeding the discrete article along a path to a laminating station between a heated laminating roller and gripping roller, providing a laminating film from a supply into contacting engagement with said laminating roller and between said laminating roller and said gripping roller in said laminating station, driving said laminating roller to draw said film from said supply through said laminating station, and maintaining a controlled driving speed on said gripping roller so that the peripheral speed of the gripping roll is less than the peripheral speed of said laminating roll to decurl said flexible film while the film is being laminated to said discrete article in said laminating station.

**4,517,043**

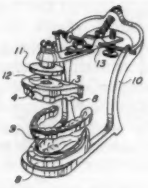
## CUSTOM DENTURE FABRICATION TECHNIC

**Raymond H. Martin, 88 Brisbon Rd., Somerset, Mass. 02726; Ugo S. Garganese, 1790 Warwick Ave., Warwick, R.I. 02889, and John R. Griffin, 5 Franconia St., Dorchester, Mass. 02122**

**Continuation-in-part of Ser. No. 271,806, Jun. 8, 1981, abandoned, and Ser. No. 405,427, Aug. 5, 1982, Pat. No. 4,500,289, and Ser. No. 71,948, Sep. 4, 1979, Pat. No. 4,337,039. This application Sep. 26, 1983, Ser. No. 536,363**

**Int. Cl.**[3] **B29C** *27/00, 17/03, 17/10, 23/00*

**U.S. Cl. 156—196** **5 Claims**



1. A method for forming dentures from stock preformed dental arches having teeth pre-mounted thereon, and custom-made dental bases, comprising: forming cast stone jaw models against jaw impressions in suitable molds; removing the material of said impressions leaving the jaw molds; luting a wax bite registration impression between said jaw models to form an assembly; positioning said assembly on an articulator with said models keyed to the articulator in reproducible positions; removing the models from the articulator and heating and vacuum forming thermoformable plastic sheet material about said models and cooling said sheet material to form custom fitted denture bases; and returning the denture bases to said models; positioning said models in the same position on the articulator as before; attaching a suitable preformed plastics dental arch with preset teeth to each of said bases on said articulator to form said dentures.

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**4,517,044**

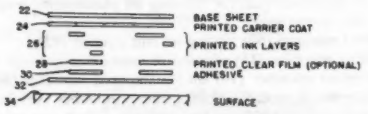
## DRY TRANSFER DECAL AND METHOD OF MANUFACTURE

**Raymond M. Arnold, Chicago, Ill., assignor to Advanced Graphic Technology, Chicago, Ill.**

**Division of Ser. No. 322,596, Nov. 18, 1981, Pat. No. 4,421,816. This application Oct. 28, 1983, Ser. No. 546,521**

**Int. Cl.**[3] **B44C** *1/16;* **B32B** *31/00, 3/18;* **B41M** *3/12*

**U.S. Cl. 156—277** **3 Claims**




1. A method of manufacture of an improved pressure sensitive, laminated, dry transfer decal that does not require complex or expensive processing steps comprising the steps of:

printing a carrier coat of cross linked, polymeric material in a range of 0.005 to 0.020 inches thickness and in form and extent of a complete image of a decal on a polymeric base sheet;

subsequently drying the carrier coat to form a dried carrier coat;

printing at least one ink layer on the dried carrier coat within the form and extent of the carrier coat to define a portion of the image;

printing a second coat of cross linked, polymeric material over the printed ink layers, said carrier coat and second

coat providing protection for the ink layers to form a combination of layers; and

coating the combination of layers with a high tack adhesive over the total form and extent thereof to provide a releasable, pressure sensitive decal on a support backing of a base sheet.

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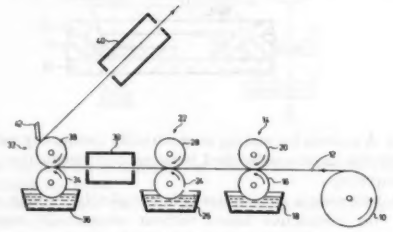
**4,517,045**

## APPARATUS FOR FORMATION OF PACKAGING MATERIAL

**Donald E. Beckett, 963 Tennyson Ave., Mississauga, Ontario, Canada L5H 2Y9**

**Division of Ser. No. 302,370, Sep. 15, 1981, Pat. No. 4,398,994.**
**This application Jun. 13, 1983, Ser. No. 489,070**
**Int. Cl.³ C23F *1/02*; B44C *1/22*; C03C *15/00, 25/06***
**U.S. Cl. 156—345** **5 Claims**



1. Apparatus for forming a repetitive pattern on a roll of aluminized polymer film, comprising

holder means for holding said roll of aluminized polymer film so that a web may be drawn therefrom;

printing station means for printing a desired pattern on said web, said printing station means including a rotary patterned printing surface for engagement with the aluminized surface of said web and etchant-resistant material application means for applying etchant-resistant material to said pattern on said printing surface;

etchant material-applying station means located spaced from said printing station means in a direction downstream of the intended direction of motion of said web, said etchant-material applying station means including a rotary surface for engagement with the patterned surface of said web and etchant-material application means for applying a film of sodium hydroxide solution to said rotary surface;

washing station means located spaced from said etchant material-applying station means in a direction downstream of the intended direction of motion of said web, said washing station means including wash water applying and removal means for application of wash water to the etchant-applied surface of the web to wash spent sodium hydroxide therefrom and removal of the resulting spent wash water therefrom

drying means for drying said washed web; and

take up means for taking up a roll of the dried web of patterned film.

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**4,517,046**

## DEVICE FOR MAKING GROOVES IN CIGARETTE FILTERS

**Richard Heaney, Campbell, and Erik I. Naslund, Los Gatos, both of Calif., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.**

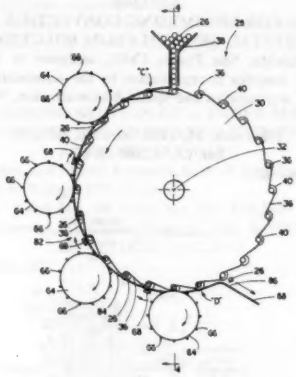
**Filed Jul. 18, 1984, Ser. No. 631,963**
**Int. Cl.³ B29C *17/00*; A24C *5/50***
**U.S. Cl. 156—500** **21 Claims**

1. An apparatus for making elongated grooves in the peripheral surface of a filter rod, comprising:

a generally cylindrical, rotatably drum;

means defining a plurality of filter rod receiving channels in the peripheral surface of the drum, the filter rod receiving channels being open to the peripheral surface of the drum, the longitudinal axes of the channels being parallel to the rotational axis of the drum;

means located adjacent to the periphery of the drum for successively forming a plurality of circumferentially



spaced apart grooves in the peripheral surface of the filter rods disposed in the channels; and,

means for indexing filter rods in selected ones of the channels about the longitudinal axes of the filter rods to position the filter rods for succeeding groove formation by the groove forming means.

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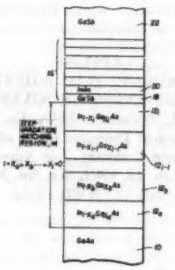
**4,517,047**

## MBE GROWTH TECHNIQUE FOR MATCHING SUPERLATTICES GROWN ON GAAS SUBSTRATES

**Chin-An Chang, Peekskill; Leroy L. Chang, Goldens Bridge, and Leo Esaki, Chappaqua, all of N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Jan. 23, 1981, Ser. No. 227,889**
**Int. Cl.³ C30B *25/02***
**U.S. Cl. 156—610** **14 Claims**



1. The method of growing multilayer semiconductor devices wherein lattice mismatch between first and second semiconductor layers having respective different compositions is overcome by substantially reducing the misfit dislocation density while enhancing electron mobility therebetween, comprising the steps of:

sequentially growing on said first layer a plurality of successive intermediate semiconductor layers of predetermined thickness whose composition varies in discrete graded steps of semiconductor composition from a composition

which substantially matches the lattice parameters of the first layer to a composition which substantially matches the lattice parameters of the second layer; and

thereafter growing said second layer on the outermost inner intermediate layer.

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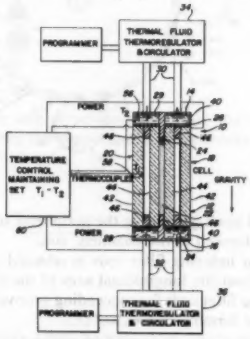
**4,517,048**

## METHOD FOR MINIMIZING CONVECTION DURING CRYSTAL GROWTH FROM SOLUTION

**Paul J. Shlichta, San Pedro, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Oct. 31, 1983, Ser. No. 547,175**
**Int. Cl.³ C30B *19/02***
**U.S. Cl. 156—621** **10 Claims**




1. A method of growing in a gravitational field a macroscopic crystal from a solution including the material from which the crystal is made and a solvent for the material, comprising:

(a) holding the solution in a chamber which is relatively thin, this thin dimension being generally perpendicular to the vertical;

(b) disposing in the chamber at either end a substrate crystal from which the crystal grows; and

(c) controlling the temperature conditions of the solution so that the crystal forms, and as the crystal forms, the effect of buoyant convection within the solution is minimized.

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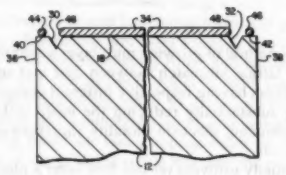
**4,517,049**

## SILICON RIBBON GROWTH WHEEL WITH EDGE DEFINING GROOVES

**G. Felix Wakefield, Woodland Hills; David L. Bender, and Samuel N. Rea, both of Thousand Oaks, all of Calif., assignors to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Jun. 23, 1982, Ser. No. 391,095**
**Int. Cl.³ B30B *19/12***
**U.S. Cl. 156—622** **11 Claims**



1. In apparatus for production of semiconductor ribbon in which molten semiconductor material is brought into contact with a moving chill surface, the improvement comprising:

a chill surface having a pair of longitudinal grooves, said grooves spaced apart by a desired ribbon width.

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**4,517,050**

## PROCESS FOR FORMING CONDUCTIVE THROUGH-HOLES THROUGH A DIELECTRIC LAYER

**Daniel D. Johnson, Yorklyn, Del., and Herbert L. Fritz, Englishtown, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Dec. 5, 1983, Ser. No. 558,307**
**Int. Cl.³ B44C *1/22*; C03C *15/00, 25/06*; C23F *1/02***
**U.S. Cl. 156—643** **16 Claims**

1. A process for making an electrically conducting path in a dielectric layer sandwiched between two conductive layers comprising

(a) forming a noncircular hole completely through one of the conductive layers without substantially removing material from the dielectric layer by etching a portion of the conductive layer;

(b) through said hole etching the dielectric whereby a pathway is formed completely through the dielectric layer between the conductive layers and whereby the conductive layer is undercut of dielectric material adjacent the hole in said conductive layer;

(c) deforming the conductive layer which has been undercut toward the other conductive layer, and

(d) forming an electrical conducting path between the two conductive layers through the pathway.

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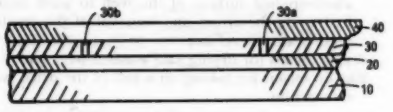
**4,517,051**

## MULTI-LAYER FLEXIBLE FILM MODULE

**Charles E. Gazdik, Endicott, and Donald G. McBride, Binghamton, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Division of Ser. No. 453,443, Dec. 27, 1982,. This application Apr. 13, 1984, Ser. No. 599,839**
**Int. Cl.³ C23F *1/02*; B44C *1/22*; C03C *15/00*; B29C *17/08***
**U.S. Cl. 156—644** **6 Claims**




1. The method of making double-sided thin, flexible circuitry by

depositing a first layer of circuitry on a substrate,

covering said first layer of circuitry with a thin layer of polyimide,

etching vias into said layer of polyimide,

curing said polyimide,

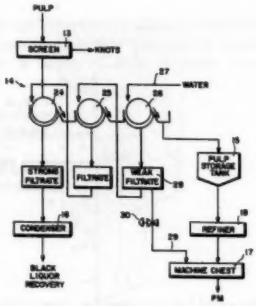
depositing a second layer of circuitry on top of said polyimide, and

etching away said substrate with a material that attacks said substrate but which does not attack said first layer of circuitry.

## 4,517,052
## INTERNAL SIZING WITH BLACK LIQUID

Edmund M. Choy, Cloquet, Minn., assignor to Westvaco Corporation, New York, N.Y.

Filed Dec. 8, 1983, Ser. No. 559,379
Int. Cl.[3] D21D 3/00
U.S. Cl. 162—11 3 Claims




1. A method for manufacturing unbleached, presized paper comprising the steps:

(a) cooking wood chips or the like in a digester to delignify the wood chips;

(b) discharging the cooked chips into a blow tank to make pulp;

(c) screening the pulp to remove knots and the like;

(d) washing the pulp in a multiple stage washer to remove the cooking liquor from the pulp;

(e) directing the washed pulp to a pulp storage tank for use in the machine chest of a papermachine; and,

(f) directing the wash water containing the spent cooking liquor to a distillation process where it is concentrated and separated, the improvement wherein a portion of the wash water from the final stage of the washing step is diverted without further treatment to the machine chest of a papermachine to pre-size the washed pulp, said diverted wash water containing from about 0.08–0.23 weight percent rosin.

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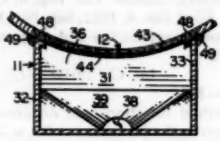
## 4,517,053
## APPARATUS FOR SAMPLING PAPER PULP LIQUOR

James B. Devine, 505 S. Wilbur, Walla Walla, Wash. 99362

Filed Nov. 8, 1982, Ser. No. 440,093
Int. Cl.[3] D21C 7/12
U.S. Cl. 162—251 1 Claim




1. Apparatus for withdrawing a sample of the liquid fraction of paper pulp stock from the periphery of a conduit carrying such stock under pressure above the pressure of the ambient atmosphere comprising, in combination:

a sampler having a peripherally defined extraction chamber carried externally of the conduit with a permeable member forming an interface between the interior member comprising

a plate and screen joined at their edges by a rigid frame substantially the same size and configuration as the interface and the thickness of the screen and the plate being substantially the same as the thickness of the conduit wall, and wherein the frame containing the permeable member is sealed to the conduit and sampler so that the outer surface of the screen is coincident with the inner surface of the conduit;

valve means for adjustably regulating the pressure in the sampler chamber between that of the pulp stock and that of the ambient atmosphere; and

conduit means for removing the liquid fraction in the sampler chamber for subsequent testing.

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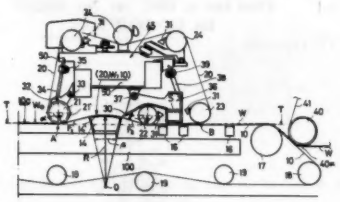
## 4,517,054
## WEB-FORMING SECTION OF A PAPER MACHINE INTENDED FOR MODERNIZATION OF A FOURDRINIER WIRE

Jorma Hujàla, and Martti Koponen, both of Jyväskylä, Finland, assignors to Valmet OY, Finland

Filed Sep. 29, 1982, Ser. No. 430,232
Claims priority, application Finland, Mar. 2, 1982, 82 0743
Int. Cl.[3] D21F 7/02, 9/02
U.S. Cl. 162—301 16 Claims



1. In a web-forming section of a paper machine, such as modernization of a fourdrinier-wire part, comprising a fourdrinier wire loop having a wire run constituting a lower wire of said web-forming section and a single-wire, substantially horizontal initial portion of a dewatering zone of the web-forming section within which web-forming stock is dewatered through the lower wire by draining means, said web-forming section further comprising an upper wire unit including a looped upper wire guided by guide and web-forming rolls, said upper wire together with a run of said lower wire forming a two-wire dewatering zone within which dewatering takes place substantially through the upper wire, the improvement comprising a combination of the following components arranged so as to be jointly operative as follows:

a first forming roll having an open face situated inside the upper wire loop, said two-wire dewatering zone beginning in the region of said first forming roll where said two-wire dewatering zone is curved upwardly over a sector of said first forming roll, and wherein a horizontal plane tangent to the lower part of said first forming roll is substantially coplanar with the plane of said lower wire and the open face of said first forming roll has an open area which is at least 50% of the entire area of said roll;

a forming shoe within the two-wire dewatering zone situated within the fourdrinier wire loop after said first open forming roll in the direction of web travel, said forming shoe being provided with a curved deck which contacts the lower wire, said deck being curved downwardly over a certain angle and wherein said deck has an upper face which is located above the plane of said lower wire;

a reversing roll situated inside the upper wire loop after said forming shoe in the direction of web travel and guiding a joint run of the upper and lower wires over an upwardly curved sector of said reversing roll until said joint run substantially coincides with the plane of said lower fourdrinier wire;

a second reversing roll situated within the upper wire loop for separating the upper wire from the lower wire before the upper wire reaches said second reversing roll; and

wherein said forming and reversing rolls and forming shoe situated therebetween are situated with respect to each other such that after the initial dewatering occurs in the single-wire initial portion of the dewatering zone to an appropriate extent through the lower wire, dewatering takes place within the two-wire dewatering zone, first within said sector of said first open forming roll in two directions through both said upper and lower wires, whereupon within the region of said forming shoe, the dewatering takes place primarily upwardly through the upper wire, and

wherein lowermost points of said first forming roll, said first reversing roll, and said second reversing roll are all disposed at substantially the same level.

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**4,517,055**

## SLICE LIP CONTROL

**Norman F. Dove, 1493 Crown St., North Vancouver, British Columbia, Canada V7J 1G4**

**Filed Jun. 6, 1983, Ser. No. 501,530**

**Int. Cl.³ D21F *1/06***

**U.S. Cl. 162—344** **26 Claims**

1. In a paper making machine having a slice lip to control the feed from a head box to a wire on which the paper is formed;

a coupling to attach the lip of the head box to the head box, the coupling comprising a body adapted to be attached to an adjuster extending from an actuator, means attaching the body to the head box to permit movement of the body relative to the head box, under the influence of the actuator, the improvement whereby the body has a first recess adapted to receive the lip;

means defining a second recess, generally perpendicular to the first recess;

means located in the second recess to engage the lip received in the first recess to pivotally clamp the lip against the head box.

20. A position transmitter to signal the position of a lip on a head box of a paper making machine, the transmitter comprising a first flexible vessel to contain a substantially incompressible fluid;

a sensor attached to the first flexible vessel and attached to the lip;

a second flexible vessel;

means tending to compress the second flexible vessel;

a conduit connected to the first and second flexible vessels whereby movement of the lip moves the sensor to expand or contract the first flexible vessel to move the incompressible fluid through the conduit to expand or contract the second flexible vessel; and

means to sense the movement of the second vessel.

**4,517,056**

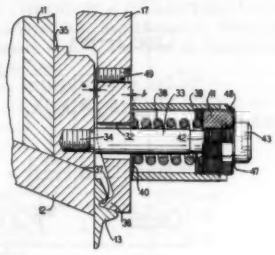
## SLICE LIP ADJUSTMENT

**Arnold J. Roerig, and Robert W. Schroeder, both of Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.**

**Filed Dec. 1, 1983, Ser. No. 556,896**

**Int. Cl.³ D21F *1/02, 1/04, 1/06***

**U.S. Cl. 162—344** **5 Claims**



1. In a papermaking machine for depositing a fiber suspension onto a forming wire through a slice opening of adjustable dimension,

a slice body,

a slice lip abutting said slice body and movable relative thereto,

an adjusting arm having an aperture extending therethrough,

engagement means interconnecting said adjusting arm and said slice lip,

a threaded, headed bolt passing through the aperture in said adjusting arm and received in threaded engagement in said slice body,

a plug received in threaded engagement at the head of said bolt,

a compressed spring acting between said plug and said adjusting arm,

a tube having two opposing ends and having an internally threaded portion receiving the plug in threaded engagement at one of said ends, the opposite end of said tube being spaced from said adjusting arm by a small predetermined clearance, and

locking means locking said tube in an adjusted position relative to said plug.

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**4,517,057**

## METHOD AND APPARATUS FOR SHORT-PATH DISTILLATION

**Friedrich Fauser, Hammersbach, and Willi Fischer, Seligenstadt, both of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany**

**Filed Jun. 4, 1982, Ser. No. 385,236**

**Claims priority, application Fed. Rep. of Germany, Jun. 6, 1981, 3122652**

**Int. Cl.³ B01D *3/12***

**U.S. Cl. 202—205** **15 Claims**

1. In a method for short-path distillation of a liquid in a vacuum, wherein the liquid flows for at least quasi-turbulant flow and along an evaporating surface from an inlet to an outlet for distillable fractions of the liquid to evaporate therefrom and condense onto a condensation surface arranged a short distance away, the improvement comprising:

placing the liquid upon the evaporating surface at the inlet at a temperature such that the energy required for the evaporation of the distillable fractions therefrom is taken at least partially from the still-unevaporated fraction of the liquid thereon; and

decreasing the temperatures of the condensation surface and, continually, the evaporation pressures from the inlet toward the outlet, the evaporation pressures being in the range of from about 10 to about 0.1 mgar.

4. Apparatus for short-path distillation of a distillable fraction of a liquid, comprising:

a vacuum chamber;

an evaporation surface in the vacuum chamber from which the distillable fraction of the liquid can evaporate;

a condensation surface in the vacuum chamber along and at a sufficiently short distance from the evaporation surface for the evaporated distillable fraction of the liquid to condense thereonto;

inlet means for applying the liquid to the evaporation surface at a temperature such that the energy required for the evaporation is taken at least partially from the still-

unevaporated fraction of the liquid on the evaporation surface;

means designed for producing at least quasi-turbulent flow of the liquid along the evaporation surface away from the inlet means;

means for decreasing the temperatures of the condensation surface away from the inlet means; and

vacuum means for providing pressure in the vacuum chamber in the range of from about 10 to about 0.1 mbar and decreasing the same continually away from the inlet means.

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**4,517,058**

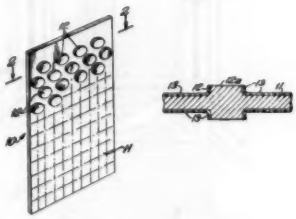
## METHOD FOR ELECTROFORMING METAL SLUGS AND REUSABLE INTEGRATED CATHODE UNIT

**Donald R. Hodges, Denver, and William G. Sherwood, Golden, both of Colo., assignors to AMAX Inc., Greenwich, Conn.**

**Filed Nov. 2, 1983, Ser. No. 548,125**

**Int. Cl.³ C25D** *1/00, 17/12*

**U.S. Cl. 204—4** **9 Claims**



6. A method for producing electrolytically deposited metal slugs which comprises,

inserting into a metal-containing electrolyte an anode and a cathode,

said cathode comprising a cathode matrix in the form of a laminar metal substrate having an array of raised cylindrical bosses with sidewalls and having exposed flat faces distributed over said substrate and integral therewith,

the total surface of said cathode including the sidewalls of the bosses being covered with a coating of an adherent layer of an electrolyte resistant, substantially impermeable, low conductivity material, except for the exposed faces of said bosses which are adapted to receive electrodeposited metal thereon,

the coated sidewalls of said raised bosses extending upwardly from the coated laminar metal substrate,

passing a current from said anode to said cathode whereby metal is electrodeposited on the raised exposed faces of said bosses,

and continuing said deposition until the desired size of electrodeposited slugs is obtained on the raised faces of said bosses.

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**4,517,059**

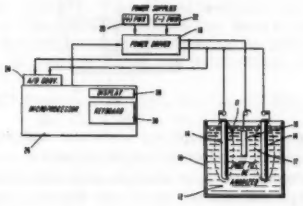
## AUTOMATED ALTERNATING POLARITY DIRECT CURRENT PULSE ELECTROLYTIC PROCESSING OF METALS

**David M. Loch, Seattle, and Dale D. Henkes, Kent, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Jul. 31, 1981, Ser. No. 289,105**

**Int. Cl.³ C25D** *5/18, 11/02*

**U.S. Cl. 204—14.1** **29 Claims**



1. A method for electroprocessing the surface of a metal, said method comprising the steps of:

immersing said metal surface and an electrode means in an electrolyte:

flowing anodizing and degassing current pulses between said surface and said electrode means, said anodizing and degassing current pulses having pulse widths defining anodizing and degassing time durations respectively which define an anodizing to degassing time ratio, said anodizing pulses being of a polarity which causes said metal surface to be anodic with respect to said electrode means and said degassing pulses being of a polarity opposite to that of the anodizing pulses or of a zero magnitude wherein the flowing of said anodizing and degassing current pulses results in a process voltage $V_p$ between said metal surface and said electrode means;

sensing the process voltage $V_p$ during the flowing of said anodizing and degassing current pulses and

varying said time ratio by means of a preprogrammed microprocessor responsive to the sensed process voltage $V_p$ to maintain the process voltage $V_p$ at a level below a predetermined burn voltage $V_b$.

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**4,517,060**

## METHOD AND BATH FOR ELECTRODEPOSITING A VIOLET-COLORED GOLD-COPPER-BISMUTH ALLOY

**Manfred Dettke, and Rudolf Klein, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

**Filed May 29, 1984, Ser. No. 615,471**

**Claims priority, application Fed. Rep. of Germany, May 27, 1983, 3319772**

**Int. Cl.³ C25D** *3/62*

**U.S. Cl. 204—44** **15 Claims**

1. Aqueous bath for the galvanic deposition of uniformly rose to violet-colored gold alloys, comprising

an alkali- or ammonium-dicyanoaurate-I,

an alkali copper cyanide,

an alkali cyanide and

a water-soluble complex compound of bismuth.

**4,517,061**

## PROCESS FOR PREPARING ARYLACETIC AND ARYLPROPIONIC ACIDS

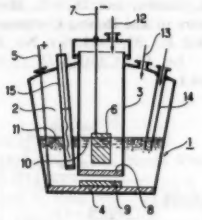
**Jean-Francois Fauvarque; Anny Jutand, both of Paris; Claude Chevrot, Saint-Germain en Laye; Fernando Pfluger, Saint-Denis, and Michel Troupel, Maincy, all of France, assignors to Compagnie General d'Electricite and Centre National de la Recherche Scientifique (CNRS), both of Paris, France**

**Filed Jul. 13, 1983, Ser. No. 513,497**

**Claims priority, application France, Jul. 13, 1982, 82 12275**

**Int. Cl.³ C25B** *1/00*

**U.S. Cl. 204—59 R** **18 Claims**



1. A process for preparing arylacetic and arylpropionic acids, including an electrochemical reduction, under carbon dioxide atmosphere at or close to atmospheric pressure, of benzyl type halogenides with the formula $ArCH_2X$ or, $ArCH(CH_3)X$ characterized by the fact that said reduction is effected in the presence of a catalyst comprising at least one organometallic complex comprising a transition metal complexed with a bidentate or tetradentate coordinate.

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**4,517,062**

## PROCESS FOR THE ELECTROCHEMICAL SYNTHESIS OF ETHYLENE GLYCOL FROM FORMALDEHYDE

**James J. Barber, Montvale, N.J., assignor to The Halcon SD Group, Inc., New York, N.Y.**

**Filed Nov. 3, 1983, Ser. No. 548,461**

**Int. Cl.³ C25B** *3/10*

**U.S. Cl. 204—77** **15 Claims**

1. A process for the formation of glycols through the electrochemical coupling of formaldehyde in neutral or acidic solutions comprising:

forming an aqueous solution of formaldehyde of effective strength;

adding an effective amount of a suitable electrolyte selected from the group of salts having a composition MX, wherein M represents any univalent cation and X represents an anionic species including the halides, sulfates, tetrafluoroborates, and perchlorates, as well as mixtures thereof;

forming the predetermined glycol product by passing an effective amount of electrical current between a cathode, formed from a carbon-based material, and an anode, formed from a non-corrodible substance, immersed in the electrolytic solution;

separating the resultant formed glycol from the reaction mixture.

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**4,517,063**

## PHOTOCHEMICAL REACTOR AND METHOD FOR CARRYING OUT PHOTOCHEMICAL REACTIONS THEREIN

**Larry M. Cirjak, Burton, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio**

**Filed Feb. 13, 1984, Ser. No. 579,255**

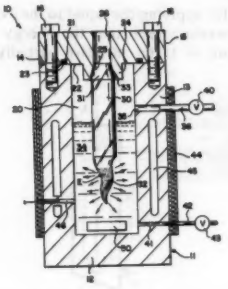
**Int. Cl.³ B01J** *19/12*

**U.S. Cl. 204—157.1 R** **26 Claims**

8. A method for carrying out a photochemical reaction in a reaction chamber having means extending substantially into said reaction chamber for transmitting light energy from a source external thereof into said reaction chamber, comprising the steps of:

introducing a reactant solution into said reaction chamber;

exposing a first end of said means for transmitting light energy to a light source;



dispersing light from a second end of said means for transmitting light energy within said reaction chamber; and,

irradiating said reactant solution with said dispersed light within the reaction chamber thereby enabling reaction of said reactant solution to occur.

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**4,517,064**

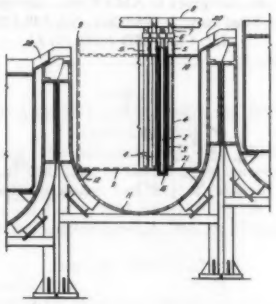
## ELECTROLYTIC CELL

**Melvin S. Cook, Tucson, Ariz., assignor to Duval Corporation, Tucson, Ariz.**

**Filed Sep. 23, 1983, Ser. No. 535,235**

**Int. Cl.³ C25B** *1/00*

**U.S. Cl. 204—105 R** **6 Claims**



1. A process for electrolytically producing a particulate crystalline metal product having limited adherence to the surface of a cathode, comprising:

providing a cathode, an anode, a diaphragm spaced from said cathode and disposed between said cathode and anode, and a mesh member disposed adjacent the surface of said diaphragm nearest said cathode, and

agitating said mesh member relative to said cathode to effectively influence and contribute to the control of crystalline product size and density as well as the structural integrity of crystalline dendrites and to dislodge a portion of the dendritic growths from said cathode by engaging said mesh member with said growths.

4,517,065

## ALLOYED-LEAD CORROSION-RESISTING ANODE

Renato Guerriero, Mestre, Italy, assignor to SAMIN Societe Azionaria Minero-Metallurgicia S.p.A., Rome, Italy

Division of Ser. No. 311,613, Oct. 15, 1981,. This application Nov. 30, 1983, Ser. No. 556,558
Claims priority, application Italy, Oct. 20, 1980, 25458 A/80
Int. Cl.[3] C25C *1/14*
U.S. Cl. 204—119 7 Claims

1. A method for the electrowinning of a non-ferrous metal, said method comprising subjecting an acidic solution containing said non-ferrous metal to an electric current in an electrolytic cell in which the anode is composed of from 98.9% to 99.9% of lead, from 0.1% to 1% calcium and 0% to 0.1% silver, on a weight basis, and thereafter recovering said non-ferrous metal.

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4,517,066

## ION BEAM DEPOSITION OR ETCHING RE RUBBER-METAL ADHESION

David A. Benko, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 401,201, Jul. 23, 1982, Pat. No. 4,446,197. This application Feb. 16, 1984, Ser. No. 580,585
Int. Cl.[3] C23C *15/00*
U.S. Cl. 204—192 C 8 Claims

1. A process for preparing a metal surface for adhesion to rubber, comprising the steps of:

applying a metal to a metal substrate utilizing an ion beam sputter deposition process until a coating of from about 5 to about 4,000 angstrom units is obtained;

the coating metal being selected from the group consisting of steel, zinc, copper, iron, nickel, aluminum, cobalt, and alloys thereof including brass, and

applying rubber to said coated metal surface.

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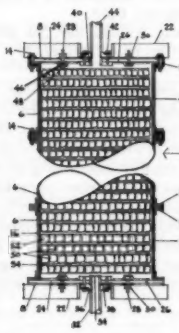
4,517,067

## DISCRETE PARTICULATE BIPOLAR REACTOR

John J. Byerley, 154 Chelford Crescent, and Kurt Enns, 345 Dale Crescent, both of Waterloo, Ontario, Canada

Filed Jan. 26, 1983, Ser. No. 461,279
Claims priority, application Canada, Sep. 29, 1982, 412431
Int. Cl.[3] C25B *13/04*
U.S. Cl. 204—255 8 Claims



1. An electrochemical bipolar reactor comprising a reactor tank having an inlet and an outlet, said tank having an inert inner surface and containing numerous conductive particles in a reaction zone between said inlet and outlet, said particles being held in a fixed relationship to one another and each particle or small group of particles being at least partially covered with a fluid permeable membrane of non-conductive material so that each particle or small group of particles is electrically insulated from adjacent particles or adjacent small groups of particles, said conductive particles being located between two primary electrodes, one primary electrode being located at a start of said reaction zone and another primary electrode being located at an end of said reaction zone, said primary electrodes being insulated from the particles by a layer of non-conductive material, said particles being essentially piled on top of one another from a bottom to a top of the reactor tank and means for applying an electrochemical potential across said primary electrodes.

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4,517,068

## ELECTROCATALYTIC ELECTRODE

Jean M. Hinden, Chambesy, Switzerland; Lynne M. Ernes, Euclid, and Patrick E. Visel, North Madison, both of Ohio, assignors to Eltech Systems Corporation, Boca Raton, Fla.

PCT No. PCT/US81/01763, § 371 Date Aug. 26, 1983, § 102(e) Date Aug. 26, 1983, PCT Pub. No. WO83/02288, PCT Pub. Date Jul. 7, 1983
PCT Filed Dec. 28, 1981, Ser. No. 527,552
Int. Cl.[3] C25B *11/03, 11/00*
U.S. Cl. 204—283 10 Claims

1. An electrode comprising an electrocatalyst based on the oxides of ruthenium, palladium and titanium, characterized in that the electrocatalyst consists of a three-component mixed oxide containing:

22–55% Ru

0.2–22% Pd and

44–77.8% Ti

calculated as molar percentages of the respective oxides.

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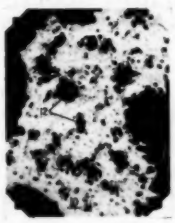
4,517,069

## TITANIUM AND TITANIUM HYDRIDE RETICULATES AND METHOD FOR MAKING

Marilyn J. Harney, Painesville; Elvin M. Vauss, Jr., Cleveland, and Ajit Y. Sane, Willoughby, all of Ohio, assignors to Eltech Systems Corporation, Boca Raton, Fla.

Continuation-in-part of Ser. No. 396,747, Jul. 9, 1982, abandoned. This application Jul. 1, 1983, Ser. No. 509,731
Int. Cl.[3] C25B *11/00;* C25C *7/02*
U.S. Cl. 204—290 F 20 Claims



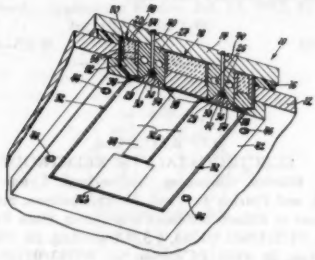
1. A self-supporting reticulate of titanium hydride essentially free of carbonaceous matter or a self-supporting reticulate of titanium essentially free of carbonaceous matter, said reticulate having an open cell foam morphology including interconnected pores in the size range from about 0.04 cm to about 1.0 cm bounded by strands having an average thickness of less than 10 mils.

**4,517,070**

## MAGNETRON SPUTTERING CATHODE ASSEMBLY AND MAGNET ASSEMBLY THEREFOR

**Howard D. Kisner, Wichita Falls, Tex., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jun. 28, 1984, Ser. No. 625,847**
**Int. Cl.³ C23C *15/00***
**U.S. Cl. 204—298** **5 Claims**



1. A planar magnetron sputtering cathode assembly comprising:

a backing plate of magnetic material;

a bar-shaped inner magnet assembly and an elongated annular outer magnet assembly surrounding the inner magnet assembly, the assemblies having mutually facing surfaces bounding a space between the assemblies, each assembly having a first pole directly attached to the backing plate for support thereby and for efficient magnetic coupling and a second pole spaced from the backing plate to establish a magnetic field between the two said second poles;

each magnet assembly including magnet means having two poles, a magnetic steel polepiece engaging one of the magnet poles, a nonmagnetic steel channel snugly surrounding the other of the magnet poles and the sides of the magnet means and engaging the polepiece, and a weldment for hermetically sealing the channel to the polepiece, whereby the magnet means is completely encased in steel and isolated from the sputtering cathode environment;

a water-cooled heat sink in the space between the inner and outer magnet assemblies in intimate thermal contact with the said surfaces bounding the space to cool the magnet assemblies, the heat sink having a face directed away from and spaced from the backing plate; and

an elongated annular target thermally coupled to the said heat sink face in the magnetic field.

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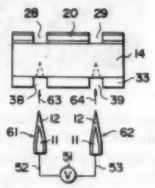
**4,517,071**

## IONIC ACTIVITY MEASURING DEVICE

**Osamu Seshimoto, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Japan**

**Filed Aug. 30, 1982, Ser. No. 413,087**
**Claims priority, application Japan, Sep. 17, 1981, 56-146730**
**Int. Cl.³ G01N *27/46***
**U.S. Cl. 204—419** **12 Claims**



1. An ionic activity measuring device comprising a substrate provided with at least one opening for receiving at least one terminal, said at least one terminal consisting of a metal layer and a water-insoluble layer made of a salt of the same metal as that forming said metal layer, an ion selecting layer supported by said substrate, and a means for bringing liquid into contact with said ion selecting layer at the point vertically aligned with said at least one opening in said substrate.

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**4,517,072**

## PROCESS FOR MODIFYING COAL TAR MATERIALS

**Samuel Cukier, Toronto, and Henry A. F. L. Kremer, Thornhill, both of Canada, assignors to Domtar Inc., Montreal, Canada**

**Continuation of Ser. No. 264,294, May 18, 1981, abandoned.**
**This application Nov. 16, 1983, Ser. No. 552,252**
**Int. Cl.³ C10C *1/18, 3/08***
**U.S. Cl. 208—45** **8 Claims**

1. In a process to obtain a pitch material from an undistilled coal tar material containing the mixture of hydrocarbon compounds which are normally separated by tar distillation, and normally including light oil, carbolic oil, wash oil and the pitch forming components, the improvement which consists essentially in decreasing the content of guinoline-insolubles (Q.I.) of said pitch material prior to distilling said coal-tar material by mixing said undistilled coal-tar material with a solvent which consists of at least one of the following: n-methyl-2-pyrrolidone and the fraction of a coal-tar distillate which boils between 100° and 350° C., said mixing being carried out at a temperature such as to form a solvent-dissolved fraction and a solvent-undissolved fraction, separating and removing said solvent-undissolved fraction of said undistilled coal-tar material, said undissolved fraction containing Q.I. having a high content of ash-forming impurities and using said solvent-dissolved fraction to produce coal-tar material with a decrease Q.I. and lower impurities by distilling said solvent-dissolved fraction of said undistilled coal-tar material so as to obtain from said solvent-dissolved product a pitch material, having a lower Q.I. and lower impurities than pitch material typically obtained by the conventional distillation of said coal-tar material.

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**4,517,073**

## HYDROCRACKING PROCESS AND CATALYST THEREFOR

**John W. Ward, Yorba Linda, Calif., and Timothy L. Carlson, Grand Junction, Colo., assignors to Union Oil Company of California, Los Angeles, Calif.**

**Filed Aug. 9, 1982, Ser. No. 406,498**
**Int. Cl.³ C10G *47/20***
**U.S. Cl. 208—111** **39 Claims**

1. In a catalytic hydrocracking process, the improvement comprising contacting a hydrocarbon feedstock with a hydrocracking catalyst under hydrocracking conditions producing a product hydrocarbon of lower average molecular weight than said feedstock, said catalyst comprising an active hydrogenation metal component on a support comprising in admixture a dispersion of silica-alumina in alumina and a crystalline aluminosilicate zeolite having the zeolite Y crystal structure, a silica-to-alumina mole ratio above about 6.0, and a water adsorption capacity at 25° C. and 4.6 mm Hg water vapor partial pressure of at least 20 percent by weight of the zeolite in its anhydrous form.

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**4,517,074**

## HYDROCARBON CONVERSION PROCESS

**John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.**

**Division of Ser. No. 84,761, Oct. 15, 1979, Pat. No. 4,419,271.**
**This application Sep. 13, 1983, Ser. No. 531,924**
**Int. Cl.³ C10G *45/12, 47/18, 47/20***
**U.S. Cl. 208—111** **44 Claims**

7. In a process for hydrocracking hydrocarbons to more valuable products of lower average molecular weight and

lower average boiling point, the improvement comprising contacting a hydrocarbon feedstock at an elevated temperature and pressure in the presence of hydrogen with a catalyst comprising in intimate admixture at least one hydrogenation component, a crystalline aluminosilicate zeolite having cracking activity, and a dispersion of silica-alumina in a matrix consisting essentially of alumina.

8. A process as defined in claim 7 wherein said hydrogenation component is one or more components selected from the group consisting of platinum, palladium, cobalt, nickel, tungsten, molybdenum, their oxides, and their sulfides.

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**4,517,075**

## CATALYSIS OVER ACTIVATED ZEOLITES

**Ralph M. Dessau, Edison, and George T. Kerr, Lawrenceville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 319,175, Nov. 9, 1981, Pat. No. 4,438,215. This application Dec. 28, 1983, Ser. No. 566,376**

**Int. Cl.³ C10G** *11/05, 47/08, 47/16*

**U.S. Cl. 208—111** **20 Claims**

1. A process for converting a feedstock comprising hydrocarbon compounds to conversion products comprising hydrocarbon compounds of lower molecular weight than feedstock hydrocarbon compounds which comprises contacting said feedstock at conversion conditions with a catalyst comprising a zeolite material prepared by a method comprising calcining a crystalline zeolite material having an initial silica:alumina mole ratio of at least about 100:1, said crystalline material having been synthesized from a reaction mixture containing quaternary onium ions, contacting said calcined crystalline material with aluminum chloride vapor at a temperature of from about 100° C. to about 600° C., hydrolyzing said aluminum chloride contacted crystalline material and calcining said hydrolyzed crystalline material.

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**4,517,076**

## REACTIVATION OF IRIDIUM-CONTAINING CATALYSTS

**Joseph P. Boyle, and John B. Gilbert, both of Sarnia, Canada, assignors to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Aug. 24, 1984, Ser. No. 643,870**

**Int. Cl.³ B01J** *23/90*

**U.S. Cl. 208—140** **18 Claims**

1. In a process for the catalytic conversion of hydrocarbons wherein a hydrocarbon feedstock is contacted with a catalyst comprised of an iridium component composited with a porous refractory inorganic oxide support at hydrocarbon conversion conditions, the catalyst having been at least partially deactivated during contact with said feedstock by coke deposition thereon, said catalyst having been regenerated after discontinuing contact of said catalyst with said feedstock in a series of steps which include

(i) providing a bed of said catalyst in a reaction zone with a chloride level on the catalyst ranging from about 0.9 percent to about 1.5 percent, based on the weight of the catalyst,

(ii) burning a preponderance of the coke from the catalyst while adding a gas containing hydrogen chloride sufficient to maintain the chloride level on the catalyst within a range of from about 0.9 percent to about 1.5 percent, based on the weight of the catalyst, and oxygen in concentration ranging up to about 5000 parts, based on the volume of gas, to provide a flame front temperature not exceeding about 425° C. sufficient to burn the coke from the catalyst, but wherein the iridium component of the catalyst is agglomerated as via inadvertent departure from the prescribed burn conditions,

(iii) the chloride level of the catalyst is increased further to at least about 1.6 percent, based on the weight of the catalyst,

the improvement comprising

contacting said catalyst subsequent to raising the chloride level of the catalyst as in (iii) with a gas containing hydrogen chloride in concentration ranging from about 150 parts to about 5000 parts, based on the volume of the gas, and up to about 5000 parts per million parts oxygen, based on the volume of the gas to provide a flame front temperature greater than about 425° C. sufficient to redisperse the agglomerated iridium and substantially complete the removal of coke from the catalyst.

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**4,517,077**

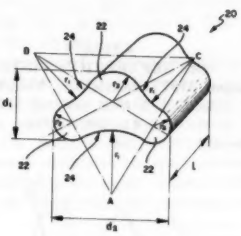
## SHAPED CATALYST PARTICLE FOR USE IN HYDROPROCESSING OF PETROLEUM OILS

**Porter Clements, Whiting, Ind., assignor to Katalco Corporation, Oak Brook, Ill.**

**Division of Ser. No. 551,063, Nov. 14, 1983, Pat. No. 4,495,307. This application Sep. 17, 1984, Ser. No. 651,447**

**Int. Cl.³ C10G** *45/08*

**U.S. Cl. 208—216 R** **2 Claims**




1. A process of hydrotreating a petroleum distillate to remove sulfur-containing or nitrogen-containing components which comprises the step of contacting the distillate with hydrogen and with a catalyst particle comprising one or more hydrogenation metals selected from Group VIB and Group VIII of the Periodic Table of Elements and a porous, inorganic oxide substrate supporting said metal or metals, said particle having a generally cylindric configuration with a cross-section of trilobular shape having concave interlobular interstices bluntly rounded with greater curvature than the curvature of the lobes, wherein the trilobular shape is defined by an equilateral triangle, the midpoints of adjacent sides of the triangle serving as the centers for two lobe-defining radii of curvature ($r_2$), the vertices of the triangle defining the centers for the interstitial radii of curvature ($r_1$), and the common intersection of the bisectors of the included angles of the triangle serving as the center for the remaining lobe-defining radius of curvature ($r_3$), said contacting being made to occur at a temperature in the range of about 500° F. to about 800° F. and a total pressure of from about 100 to about 3000 p.s.i.g.

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**4,517,078**

## METHOD AND APPARATUS FOR SEPARATING PARTICULATE MATERIALS

**Ion I. Inculet, London, Canada; Anna K. E. Norberg, Mölndal, Sweden, and Nicholas M. Hepher, Lamberhurst, England, assignors to Blue Circle Industries PLC, London, England**

**Filed Nov. 15, 1983, Ser. No. 551,810**

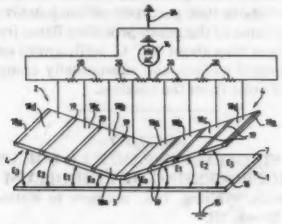
**Claims priority, application United Kingdom, Nov. 17, 1982, 8232855**

**Int. Cl.³ B03C** *7/04*

**U.S. Cl. 209—127.3** **22 Claims**

1. A method of separating particles having different physical properties, which comprises generating an alternating electric field, the electric field having a first region having field lines curved convexly in a first direction generally perpendicular to a given direction; introducing the particles into the field;

charging at least some of the particles; and causing the particles to move along the field in the said given direction, whereby a charged particle acted upon by the electric field in the said first



region is subjected to a centrifugal force in the said first direction, characterised in that the electrical potential across the said first region of the field varies with distance along the said first direction.

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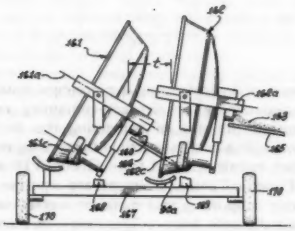
**4,517,079**

## ORE SEPARATION SYSTEM

**Keith B. Cleland, 3189 Industrial Dr., Yuba City, Calif. 95991**

**Filed Oct. 6, 1983, Ser. No. 539,716**
**Int. Cl.³ B03B *5/74***
**U.S. Cl. 209—452** **21 Claims**



**1.** In apparatus of the character described, the combination comprising

(a) first and second rotary bowls each having rotary surfaces for separating particles of ore received into the bowls, each bowl having an axis of rotation, the bowls mounted for selective and independent tilting of said axes, both bowls facing generally frontwardly,

(b) the second bowl having an open interior portion thereof openly facing toward a portion of the rear of the first bowl, with said axes offset from one another, the bowls located in closely spaced relation with the first bowl having a rearward discharge opening in particle discharge communication with said open interior portion of the second bowl,

(c) and including, for each bowl, drive means including a drive rotor suspended to engage the bowl outer surface facing away from said axis for rotating the bowl, a prime mover operatively connected with said drive rotor, and and idler roller engaging said bowl outer surface, said idler roller and said drive rotor being located to exert supporting forces on the underside of the bowl at opposite side of a vertical plane bisecting the bowl, said plane containing said axis of rotation,

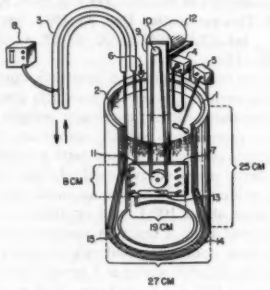
(d) and including two heads respectively suspending said drive means and said idler roller, and including support means supporting the bowl for rotation and tilting, and carrying said heads.

**4,517,080**

## APPARATUS FOR ENCAPSULATING ADDITIVES IN RESEALED ERYTHROCYTES

**John R. DeLoach; Robert L. Harris; Richard T. Mayer, all of Bryan, and Garret M. Ihler, College Station, all of Tex., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 160,753, Jun. 18, 1980, Pat. No. 4,327,710.**
**This application Dec. 21, 1981, Ser. No. 332,906**
**Int. Cl.³ B01D *31/00***
**U.S. Cl. 210—85** **4 Claims**




**1.** An apparatus for the preparation of "resealed erythrocytes" by the use of dialysis comprising:

(a) a dialyzer container consisting of a large, well insulated vessel which provides structural support to the assembled components, and within which substantially all other component parts are housed and contained therein,

(b) a dialyzing solution,

(c) a means for agitating the dialyzing solution during dialysis,

(d) a means for measuring the temperature of the dialyzing solution,

(e) a means for cooling the dialyzing solution,

(f) a means for heating the dialyzing solution,

(g) a thermostat device for activating and deactivating the cooling means (e) and the heating means (f),

(h) a specimen support and rotation assembly consisting of . . .

(1) a vertically positioned elongated member supporting . . .

a. a horizontally positioned shaft upon which is mounted an upper pulley, which turns above and outside the dialyzing solution,

b. a horizontally positioned shaft upon which is mounted a lower pulley, which turns distally near the bottom of and within the dialyzing solution,

c. a belt to transmit the turning energy from the upper pulley to the lower pulley,

d. a belt-tensioning means, and

e. a specimen holding and rotating member having pegs at each end to provide means for securing dialysis tubes thereto, said member being secured to said lower pulley,

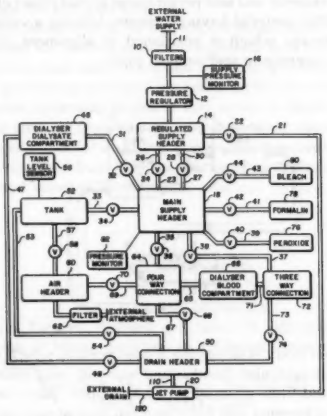
(2) a plurality of specimen dialysis tubes, and

(i) an energizing means to provide rotational energy for the pulley thus rotating said dialysis tubes.

## 4,517,081
## DIALYZER REUSE MACHINE

**Bruce P. Amiot, St. Louis Park; Larry E. Fuller, Minnetonka; Felix J. Martinez, Plymouth; Louis C. Cosentino, Wayzata; William H. Harm, Columbia Heights, and Wayne I. Nelson, Brooklyn Park, all of Minn., assignors to Renal Systems, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 322,167, Nov. 17, 1981, abandoned. This application Mar. 4, 1983, Ser. No. 472,075**
**Int. Cl.³ B01D** *31/00*
**U.S. Cl. 210—85** **16 Claims**




11. A machine for cleansing and disinfecting a hemodialyzer device so that it may be reused, the dialyzer device including a dialysate compartment and a blood compartment and each said compartment communicating with an inlet port and an outlet port, the machine comprising:

a regulated supply header;

a supply header;

tank means;

an air header open to the atmosphere;

a drain header;

jet pump means including a pump fluid inlet, a pump fluid inlet and a discharge outlet open to the atmosphere;

means for supplying water of regulated pressure to the regulated supply header;

a four-way fluid communication means;

a three-way fluid communication means;

first conduit means for supplying water at or above about 30 lbs pressure to said jet pump pumping fluid inlet;

second conduit means extending between said main supply header and said tank;

third conduit means extending between said main supply header and one branch of said four-way conduit union;

fourth conduit means extending between said main supply header and one branch of said three-way communication means;

fifth conduit means extending between a second branch of said four-way communication and said drain header;

sixth conduit means extending between a second branch of said three-way communication means and said drain header;

seventh conduit means extending between said tank and said drain header;

eighth conduit means extending between said tank and said air header;

ninth conduit means extending between a third branch of said four-way communication means and said air header;

tenth conduit means for removably connecting said main supply header to one port of said dialyzer dialysate compartment;

eleventh conduit means for removably connecting said drain header to the other port of said dialyzer dialysate compartment;

twelfth conduit means for removably connecting the fourth branch of said four-way communication means to one port of the dialyzer blood compartment;

thirteenth conduit means for removably connecting the third arm of said three-way communication means to the other port of said dialyzer blood compartment;

fourteenth conduit means between said drain header and said jet pump fluid inlet;

said first through eleventh conduit means each including a valve means therein for interrupting fluid flow therethrough;

a plurality of chemical supply conduit means, each said chemical supply conduit means connected to said main supply header and including means for connecting a chemical supply source thereto and further including a control valve means therein for interrupting flow between said chemical supply source and said main supply header;

fifteenth conduit means between said regulated supply header and said main supply header, said fifteenth conduit means including variable flow supply means for interruptably supplying water at a plurality of flow rates to said main supply header; and,

electronic control means for opening and closing said valve means and variable flow supply means according to predetermined sequences to pass fluids through the machine and dialyzer compartments for cleansing, testing and disinfecting the dialyzer, said electronic control means including means responsive to liquid volume within the tank for monitoring the liquid volume in the tank and initiating said predetermined sequences in response thereto.

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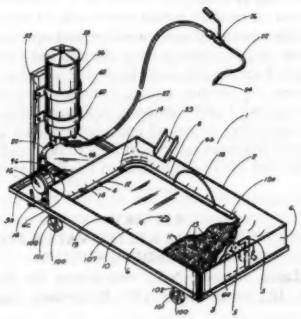
## 4,517,082
## ADVANCED DUAL-FILTERING APPARATUS

**Malcolm J. Prudhomme, P.O. Box 510, Sunset, La. 70584**

**Filed Sep. 30, 1982, Ser. No. 432,009**
**Int. Cl.³ B01D** *23/20*
**U.S. Cl. 210—117** **12 Claims**



1. A dual-filtering apparatus for filtering and purifying contaminated oils, particularly edible cooking oils contained in deep fat frying vats used in deep fat frying operations, comprising:

a. a filter tub for receiving said contaminated oils from said deep fat frying vats;

b. at least one primary filtering means mounted in a covering relationship to the bottom wall of said tub;

c. tub sump means attached through the bottom wall of said tub for facilitating transmission of partially filtered oils from said tub;

d. a combination vacuum/pressure pump disposed adjacent

to said tub for creating negative and positive pressure within the filter apparatus;

e. first conduit means connecting said tub sump means to said pump for conveying said partially filtered oils from said tub by a negative pressure created by the vacuum side of said pump;

f. a fine filtering assembly disposed upstream of said pump, fluidly communicating with a pressure side of said pump, said fine filtering assembly comprising a generally cylindrical cannister having inlet and outlet means through its bottom wall and a removable cap covering said cannister on the top; a central conduit means connected to a first outlet means for delivering finely purified oils back to said vats;

a perforated lower retainer plate fixedly attached to the central conduit of said cannister at a distance from said bottom wall and defining an annular lower sediment settlement area between said bottom wall and said lower retainer plate;

a perforated upper retainer plate mounted adjacent to the top cap of said cannister, said upper retainer plate and said cap defining an annular upper void area, which fluidly communicates with said central conduit;

a tightly wound fibrous filter element, mounted between said upper and lower retainer plates in surrounding relationship to said central conduit;

a second outlet means having a drain conduit means fluidly communicating with said lower sediment settlement area at one end and provided with a check valve at its other end, said second outlet means communicating with an exterior of said cannister through said drain conduit means;

a pair of compression sealing means fixedly attached to the upper plate in surrounding relationship to said central conduit and attached to said upper plate circumferentially around its periphery adjaacent the inner wall of said cannister in sealing engagement thereof;

g. a cannister inlet conduit means connecting said pump to said inlet means of said cannister for conveying said partially filtered oils from the pressure side of said pump into the lower sediment settlement area of said cannister for upflow filtration thereof, for thereby effecting removal of contaminated particles down to at least 1/10 of a micron in size from said oils;

h. a filtered oil conduit means connected on one end to said first outlet means of said cannister and open-ended on its opposite end for transporting the filtered oils from said cannister back to said deep fat frying vats for re-use;

i. an excess oil conduit means, connected to said second outlet means of said cannister, mounted above said filter tub for allowing excess oil and contaminants collected in the lower sediment settlement area to be expelled back to the filter tub for re-circulation in the filter system.

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**4,517,083**

## FILTER DEVICE HAVING RELIEF VALVE FOR USE IN POWER STEERING SYSTEM

**William Hayes, Elmont, N.Y., and James W. Dohrenwend, Wheaton, Ill., assignors to ARC Rebuilders, Inc., Astoria, N.Y.**

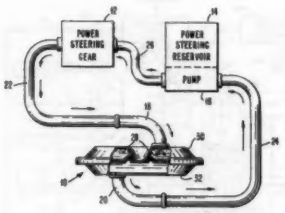
**Filed Mar. 12, 1984, Ser. No. 588,540**
**Int. Cl.³ B01D** *29/14*
**U.S. Cl. 210—131** **17 Claims**

1. A filter device for filtering the fine solid particles present in the fluid line of an automotive system comprising:

a filter housing including an upper body wall and a lower body wall, inlet means for receiving fluid in said housing, and outlet means for passing fluid out of said housing into said fluid system;

a perforated support plate comprising a thin, disc-shaped substantially rigid material designed to flex when subjected to a predetermined pressure, said support plate being mounted in said filter housing and extending across the interior of said housing for separating said housing into an inlet chamber and an outlet chamber, said support plate having a plurality of perforations for passing filtered fluid from said inlet chamber to said outlet chamber, and said support plate having a valve opening therein defined by a rim which together constitute a relief valve opening for said fluid and valve seat;

a disc-shaped filter material for filtering solid particles of a given size from said fluid, said filter material being located in said inlet chamber and covering each of said perforations in intimate contact with said support plate for filtering said particles prior to the passage of fluid through said filter material and said perforations to said outlet chamber, said filter material having a means defining a valve opening therein which is positioned in alignment with said valve opening in said support plate;




said upper body wall having a boss portion which extends through said inlet chamber and into said valve openings in both said filter material and said support plate, said boss portion pressing said filter material against said valve seat rim of said support plate to thereby seal off said valve opening from said particles under normal filtering conditions;

said support plate being designed to flex upon the buildup of a predetermined amount of fluid pressure in said inlet chamber when said filter material becomes clogged with said particles such that the support plate will be caused to move away from said valve boss portion to open said relief valve and permit fluid to bypass said filter material and pass into said outlet chamber.

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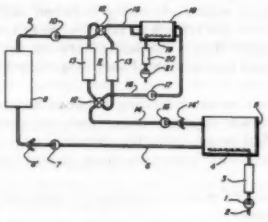
**4,517,084**

## ACTIVATED AIR AND ION EXCHANGE TREATMENT OF WATER

**Andrew J. Pincon, 421 Liberty Dr., Bolingbrook, Ill. 60439**

**Filed Nov. 5, 1982, Ser. No. 439,340**
**Int. Cl.³ A01K** *63/00*
**U.S. Cl. 210—169** **3 Claims**



1. A system for removing suspended organic matter and dissolved contaminants including ammonia in water to be recycled for reuse, said system comprising:

a tank for holding a supply of recycled water,

a first generating means for generating activated air and a carrier air stream,

air dispersing means near the bottom of said tank for receiv-

ing said activated air and carrier air stream in the tank and for dispersing said activated air into the tank to decompose organic matter in the tank and to travel upwardly through the water in the tank,

a filter means having a filter media to remove suspended organic matter from water supplied thereto from said tank,

an ion exchange means for receiving water from said filter means to remove dissolved contaminants including ammonia from the water,

means for conveying cleaned water from said ion exchange means back to said tank, and

a regenerating system for said ion exchange means including a vessel for holding an aqueous solution used to regenerate said ion exchange means and a second generating means for generating activated air and a carrier air stream and a second dispersing means in said vessel to disperse air and activated air from said second generating means in said vessel to oxidize dissolved contaminants including ammonia removed from said ion exchange means and returned to said vessel in said aqueous solution.

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**4,517,085**

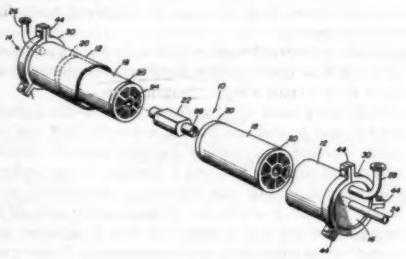
## FILTRATION DEVICES

**Michael A. Driscoll, Bedford, and James H. Edwards, Winchester, both of Mass., assignors to Millipore Corporation, Bedford, Mass.**

**Filed Sep. 15, 1983, Ser. No. 532,733**

**Int. Cl.³ B01D *31/00***

**U.S. Cl. 210—232** **8 Claims**



5. A filtration apparatus comprising:

a pressure vessel,

a plurality of spiral wound filtration modules serially arranged within the vessel,

each module including a filtration membrane wound around a filtrate collection tube having conical internally tapered portions at each end,

retaining means secured to each collection tube and engageable with the filtration membrane, and

means for removably connecting adjacent filtration modules comprising,

an interconnector comprising a rigid tubular member having conical externally tapered portions at opposite ends to form fluid tight connections with the conical internally tapered portions of the tubes of two adjacent filtration modules when the interconnector is inserted into the tubes,

the open ends of the tubular interconnector being chamfered internally and forming an acute angle and a linear anular intersection with the internally tapered portions of the filtrate tubes to permit an unrestricted flow of fluid between two adjacent filtration modules.

**4,517,086**

## TUBULAR FILTER APPARATUS

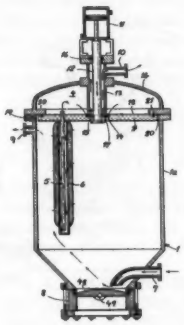
**Ingo Romey, Hünxe, and Rüdiger Lennartz, Pulheim, both of Fed. Rep. of Germany, assignors to Bergwerksverband, Essen and Boll & Kirch Filterbau GmbH, Kerpen, both of, Fed. Rep. of Germany**

**Filed Apr. 1, 1983, Ser. No. 481,290**

**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1982, 3212316**

**Int. Cl.³ B01D *25/32***

**U.S. Cl. 210—323.2** **10 Claims**



1. A filtration apparatus comprising:

a housing internally divided by a limitedly vertically displaceable horizontal partition into a lower filtrand chamber and an upper filtrate compartment, said filtrand chamber being provided with means defining a first inlet port for the admission of a slurry to be filtered in a working phase and with means defining a second inlet port for the introduction of a scavenger gas under pressure in a purging phase;

a plurality of tubular filter elements suspended from said partition into said filtrand chamber, each of said filter elements having a closed bottom and a perforated peripheral wall spacedly surrounding a riser tube projecting above said partition for delivering liquid from said slurry to said filtrate compartment while entrained solids are retained on the outer surface of said peripheral wall to form a filter cake;

a discharge duct rising in said filtrate compartment with an open lower end closely overlying said partition and reaching to a depression formed in an upper surface of said partition while leaving a narrow gap therebetween at least in an upper position of said partition, said duct being provided at a level above said gap with means defining an outlet port for the discharge of liquid forced from said filtrate compartment through said gap under pressure of entering slurry in said working phase and of said scavenger gas in said purging phase;

an impactor coupled with said partition for shaking same in regeneration phase following said purging phase to dislodge adhering filter cake from the peripheral walls of said filter elements;

gate means at the bottom of said filtrand chamber enabling the removal of dislodged filter cake from said housing; and

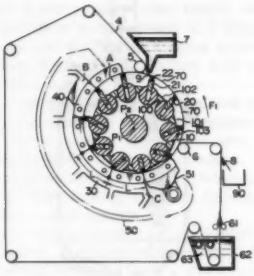
means at said second inlet port for deflecting scavenger gas entering said filtrand chamber away from said filter elements.

**4,517,087**

## FILTRATION/SEPARATION APPARATUS

**Hyosuke Nagase, 21-11, Josai-3-chome, Nishi-ku, Nagoya; Tetsuya Sato, Yachiyo; Kazuo Kobayashi, Chiba; Norio Masumoto, Ichinomiya, and Yuji Nagase, Nagoya, all of Japan, assignors to Hitachi, Ltd. and Hyosuke Nagase, both of Tokyo, Japan**

**Filed Oct. 6, 1983, Ser. No. 539,389**
**Claims priority, application Japan, Oct. 6, 1982, 57-174571**
**Int. Cl.³ B01D** *33/04*
**U.S. Cl. 210—396** **10 Claims**



9. A continuous filtration/separation apparatus comprising:

(a) a rotor mounted for rotation about a first center and having a cylindrical outer surface,

(b) guide means having an inner surface arcuate about a second center which is eccentric with respect to said first center,

(c) a plurality of frame segments mounted for travelling along the inner arcuate surface of said guide means in a direction in which a space between said guide means and said rotor is narrowed,

(d) an endless filter cloth mounted for travelling between said plurality of frame segments and said rotor in a direction in which a space therebetween is narrowed,

(e) a plurality of vanes each disposed retractably from and into the surface of said rotor and having a tip end brought into contact with said filter cloth always in a normal direction with respect to said filter cloth,

(f) a supply port for supplying a material to be processed between said filter cloth and said rotor,

(g) a take-out port for discharging the material, said take-out port being located at a position where the space between said guide means and said rotor is narrower than that of said supply port,

(h) a pair of side plates positioned at opposite end faces of said rotor for closing regions extending at lease from said supply port to said take-out port as viewed in a rotational direction of said rotor and defined by said frame segments and said rotor, said pair of side plates having said tip ends of said vanes fixed thereto,

(i) a scraping plate having a free end toward the outer surface of said rotor, and

(j) a scraping plate drive mechanism for bringing the scraping plate into contact with the outer surface of of said rotor, subsequently advancing said scraping plate in a direction opposite to the rotational direction of said rotor under the condition that said scraping plate is brought into contact with the outer surface of the rotor, and thereafter moving the scraping plate away from the outer surface of said rotor and moving said scraping plate in said rotational direction of said rotor.

**4,517,088**

## FILTERING APPARATUS

**Wendell R. Miller, Denver, Colo., assignor to Quantum Systems Corporation, Denver, Colo.**

**Continuation of Ser. No. 375,554, May 6, 1982, Pat. No. 4,427,547. This application Jul. 29, 1983, Ser. No. 518,346**
**Int. Cl.³ B01D** *25/02, 27/12*
**U.S. Cl. 210—411** **1 Claim**

1. In filtering apparatus for removing solid Particles and the like from a liquid including an outer housing and an inner filter having an inner flow passage and disposed within the housing defining therebetween an annular outer flow passage and first means including an inlet into said outer flow passage providing a forward flow through said outer passage, through said filter, and out an outlet in said inner flow passage and second means including an inlet into said inner flow passage providing a backflow through said inner flow passage, said filter, and an outlet in said outer flow passage, an improved inner filter assembly comprising:

a generally cylindrical support grid body having a plurality of liquid flow openings extending between the outer and inner faces to pass a liquid therethrough,

said body being made up of a plurality of ring-like segments stacked end to end and having means to hold said segments together, each segment having a centrally disposed continuous ring portion, and a plurality of circumferentially spaced pairs of axial portions of substantially equal length projecting axially out from opposite sides of the ring portion and having ends that abut an adjacent axial portion of an adjacent ring-like segment for forming said liquid flow openings; and

a filter medium covering the outer face of said grid body so that, in said forward flow, the liquid passes through the filter medium and then through said fluid flow openings and solid particles are deposited on said filter medium and, in said backflow, the liquid passes through said flow openings and then through said filter medium to remove said deposited particles,

each said ring portion and said axial portions having a similar cross section, said cross section being generally V-shaped, said cross section with each said ring portion and said axial portions being narrower in thickness and an outer peripheral surface supporting said filter medium than at an inner surface of said support grid body opposite said outer peripheral surface,

each ring portion encompassing a central opening, said central opening having a radial extent greater than the radial extent of said ring portion to direct the backflow liquid first in an axial direction and then in a radial direction producing a liquid flow between adjacent ring portions as well as the axial portions and at the filter medium that enhances the removal of said solid particles collected on said filter medium during said backflow of liquid.

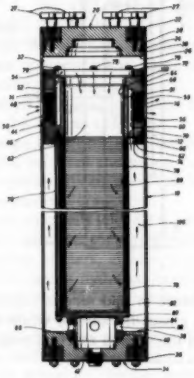
## 4,517,089
## METHOD AND APPARATUS FOR CONSTRUCTING FILTER ELEMENT

**Johnny Arnaud, Houston, Tex., assignor to Hydrotreat, Inc., Houston, Tex.**

**Continuation-in-part of Ser. No. 428,345, Sep. 29, 1982,. This application May 5, 1983, Ser. No. 491,711**

**Int. Cl.³ B01D** *39/10*

**U.S. Cl. 210—488** **10 Claims**



1. A filter mesh, comprising a plurality of structural components, each structural component including a body portion and further including a plurality of extensions extending relative to one side of said body portion, said plurality of structural components adapted to cooperatively assemble and being cooperatively shaped to form a surface having a contour similar to the general contour of a woven mesh.

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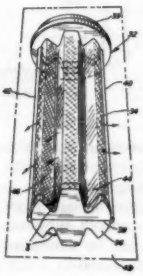
## 4,517,090
## LOW VOLUME, LARGE AREA FILTERS FOR IV OR BLOOD FILTRATION

**Jean Kersten, Villers St. Amand, and Jean M. Mathias, Loupoigne, both of Belgium, assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.**

**Continuation of Ser. No. 363,632, Mar. 30, 1982, abandoned. This application Apr. 6, 1984, Ser. No. 597,564**

**Int. Cl.³ B01D** *27/04, 29/16*

**U.S. Cl. 210—493.2** **17 Claims**



1. A flow-through medical filter element which includes filter media means and frame-like means for supporting and positioning said filter media wherein:

(a) said frame-like means is a molded member and includes a ring-like inlet end, a fluid-impervious terminal end spaced from said ring-like inlet, and a plurality of rib-like members which extend between and interconnect the inlet end and terminal end, said inlet end also having internally-extending pleat-supporting projections and said terminal end having complementary external pleat-supporting shoulders, said frame-like means being symmetrical about an axial plane which includes a mold parting line and said external shoulders being formed at angles which are not re-entrant with respect to said parting line and which permit separation of a mold along the parting line and release of the part; and

(b) said filter media means having longitudinal pleats therein and said media being bonded to internal pleat-supporting projections at the inlet end and to the external pleat-supporting shoulders at the terminal end, whereby fluid enters the filter through the inlet, flows through the filter media and thereafter exits the filter element.

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## 4,517,091
## SOLIDS-LIQUID SEPARATOR

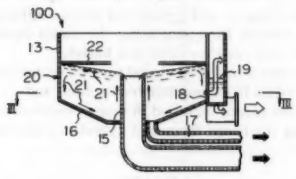
**Koichi Yamanaka, Tokyo; Tetsuro Gotoh; Masanori Aoki, both of Kanagawa; Isao Kataoka, Chiba, and Shunro Nishiwaki, Kanagawa, all of Japan, assignors to Ebara Corporation, Tokyo, Japan**

**Filed Oct. 4, 1983, Ser. No. 538,992**

**Claims priority, application Japan, Nov. 2, 1982, 57-191887; Dec. 15, 1982, 57-218397; Dec. 22, 1982, 57-223858; Mar. 28, 1983, 58-50367**

**Int. Cl.³ B01D** *21/26*

**U.S. Cl. 210—512.1** **16 Claims**




1. A solids-liquid separator for use in a sewerage system also including an upstream combined sewer and a downstream sewage treatment plant for treating sewerage comprising:

a basin having a side wall and a bottom;

an inlet port in said side wall of said basin for introducing solids-liquid into the basin so as to cause a swirling flow of solids-liquid within said basin;

foul discharge means for discharging solids settled from the liquid from the center portion of the bottom of said basin;

means for preventing incoming sewerage from exceeding processing capacity of said plant including means for defining an outflow opening in said side wall between upper and lower edges thereof for discharging treated liquid outside said system, said outflow opening being disposed in said basin wall remote from and downstream of said inlet port with respect to the direction of flow of said swirling flow so that separation between said inlet port and said outflow opening measured circumferentially with respect to said swirling flow subtends at least 180° about the center of said basin; and

overflow means for directing an overflow portion of the liquid with floatable solids to said plant including means for defining an overflow opening in said basin bottom at the center of said basin which opening is defined by an overflow edge higher than said upper edge of said outflow opening so that the surface of said swirling flow flows outwardly from the center of said basin.

## 4,517,092
## DECANTER-TYPE SEPARATING APPARATUS

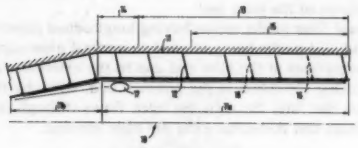
**Werner Stahl, Stalbuehlweg 8, D-6740 Landau, Fed. Rep. of Germany**

**Filed Sep. 27, 1982, Ser. No. 423,746**

**Claims priority, application Fed. Rep. of Germany, Oct. 2, 1981, 3139345**

**Int. Cl.³ B01D** *21/26*

**U.S. Cl. 210—512.1** **7 Claims**



1. A decanter-type separating apparatus for separating a solids-liquid suspension into solids and liquid, said apparatus comprising:

a conico-cylindrical barrel having a tapered section adjacent to a cylindrical barrel section said conico-cylindrical barrel rotatable at a first speed;

a solids-transporting screw rotatable at a second speed, said screw rotatable in said barrel and extending throughout said tapered and cylindrical sections of said barrel;

an intensive clarification region extending along at least part of said cylindrical barrel section;

a first pitch of said screw being greater than ten degrees in said intensive clarification region, the pith of said screw increasing in said intensive clarification region in the longitudinal direction away from said tapered section;

inlet means lying in said cylindrical section adjacent to said tapered section for introducing the solids-liquid suspension into said conico-cylindrical barrel;

first outlet means included in said tapered section for removing the solids from said tapered section; and

second outlet means included in said cylindrical section for removing the liquid from said cylindrical section.

## 4,517,093
## PROCESS FOR THE BIOLOGICAL PURIFICATION OF WASTE WATER

**Gerhard Leistner, Schmitten; Gerhard Müller, Kelkheim; Günther Sell, Hattersheim am Main, and Alexander Bauer, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Continuation of Ser. No. 572,608, Jan. 20, 1984, abandoned, which is a continuation of Ser. No. 130,070, Mar. 13, 1980, abandoned, which is a continuation of Ser. No. 10,535, Feb. 8, 1979, abandoned. This application Sep. 26, 1984, Ser. No. 655,295**

**Claims priority, application Fed. Rep. of Germany, Feb. 11, 1978, 2805793**

**Int. Cl.³ C02F** *3/12*

**U.S. Cl. 210—629** **7 Claims**

1. A process for biological purification of waste water, which process comprises

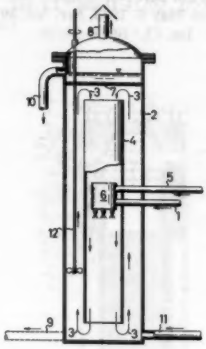
continuous charging an oxygen-containing gas, waste water, and activated sludge to a first reaction zone of an activation chamber 10 to 30 meters in height;

mixing said gas, said waste water, and said activated sludge within said first reaction zone to form a mixture of said gas, said water, and said sludge;

guiding a portion of said mixture of sludge, water, and gas in a loop-shaped flow within said first reaction zone;

feeding the remaining portion of said mixture of sludge, water, and gas, not guided in a loop-shaped flow, upwardly from the top of the first reaction zone to a second reaction zone within said activation chamber and disposed directly atop said first reaction zone;

preventing said mixture in said second reaction zone from any substantial backmixing into said first reaction zone; and



degassing said mixture in said second reaction zone to remove dissolved gasses therefrom, while biological reaction continues in the second reaction zone.

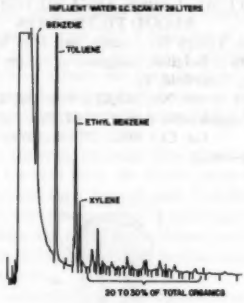
## 4,517,094
## PROCESS FOR TREATING ORGANICS CONTAMINATED WATER

**Gary W. Beall, Austin, Tex., assignor to Radecca, Inc., Austin, Tex.**

**Continuation-in-part of Ser. No. 307,300, Sep. 30, 1981, abandoned, and a continuation-in-part of Ser. No. 419,301, Sep. 20, 1982, , and a continuation-in-part of Ser. No. 419,303, Sep. 20, 1982,. This application Jun. 28, 1983, Ser. No. 518,010**

**Int. Cl.³ B01D** *15/00*

**U.S. Cl. 210—664** **13 Claims**




1. A method for removing organic contaminants from an aqueous composition contaminated with mixtures of said organic contaminants, comprising:

passing the composition through a first column packed with an organoclay, to adsorb substantial quantities of high molecular weight and/or emulsified components of said organic contaminants; and

passing the effluent from said first column through further separating means consisting of activated carbon, air stripping means and combinations of the same for separating substantial quantities of the low molecular weight components of said organic contaminants which remain in the effluent from said first column; and

recovering the effluent from said further separating means as product.

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**4,517,095**

## FLUORIDE CONTAINING COMPOSITIONS FOR REMOVAL OF POLLUTANTS FROM WASTE WATERS AND METHODS OF UTILIZING SAME

**Anthony V. Ceaser, Cemetary Rd., Great Meadows, N.J. 07838**

**Division of Ser. No. 424,902, Sep. 27, 1982, Pat. No. 4,436,645. This application Dec. 8, 1983, Ser. No. 546,367**

**Int. Cl.³ B01D** *15/04*

**U.S. Cl. 210—665** **12 Claims**

1. A method for the removal of pollutants from waste water which comprises contacting the waste waters to be treated with a composition comprising

at least members of groups (b) and (c) of the following groups (a), (b), (c) and (d):

(a) ion exchange absorbent gels, consisting of at least one member selected from the group consisting of calcined clays, amorphous silicas, aluminas, natural and artificial zeolites, perlites or vermiculite,

(b) cementitious materials selected from the group consisting of Portland cements, aluminous cements, puzzalan cements, gypsum plasters, alkaline earth metal oxides and alkaline earth metals hydrated oxides,

(c) water soluble fluoride containing salts, and

(d) alkali metal ortho phosphates,

provided that where no alkali metal ortho phosphate is present an additional component is selected from the group (a) or group (b), further provided that where no alkali metal ortho phosphate or group (a) components are present, three components are selected from group (b), at a pH above pH 6.0 and allowing the sludge formed thereby to cure for at least 24 hours.

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**4,517,096**

## METHOD OF SELECTIVE SEPARATION AND CONCENTRATION OF GALLIUM AND/OR INDIUM FROM SOLUTIONS CONTAINING LOW LEVELS OF THEM AND HIGH LEVELS OF OTHER METAL IONS

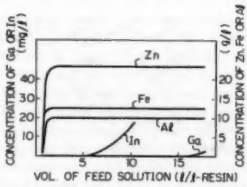
**Kunio Sekine, Narashino; Hitoshi Masuda; Kodo Ishibashi, both of Kosakamachi; Masahide Hirai, Kusatsu; Shozo Tomoshige, and Kozo Kondo, both of Uji, all of Japan, assignors to Dowa Mining Co., Ltd., Tokyo and Unitika, Ltd., Amagasaki, both of, Japan**

**Filed Apr. 4, 1984, Ser. No. 596,539**

**Claims priority, application Japan, Apr. 7, 1983, 58-60013**

**Int. Cl.³ B01D** *15/04*

**U.S. Cl. 210—668** **9 Claims**




1. A method of selective separation and concentration of at least one of gallium and indium from a solution containing them in low concentrations and containing other metal ions in relatively high concentrations, which comprises the steps of

(1) providing a solution containing at least one of gallium and indium, said solution also containing metal ions other than gallium and indium in concentrations at least ten times that of gallium and indium and having a pH between 1.0 and 4.0;

(2) passing said solution through a bed of a chelating ion exchange resin having an amino carboxylic acid group whereby said at least one of gallium and indium is adsorbed in said ion exchange resin;

(3) eluting said ion exchange resin with a mineral acid to desorb said at least one of gallium and indium and to form an eluate containing the desorbed metals;

(4) adjusting the pH of the eluate to between 1.0 and 4.0;

(5) passing the adjusted eluate through a bed of a chelating ion exchange resin having an amino carboxylic acid group whereby said at least one of gallium and indium is adsorbed on said ion exchange resin; and

(6) eluting the materials on the resin with a mineral acid to desorb said at least one of gallium and indium and recovering said at least one of gallium and indium from the resulting eluate wherein it is present in a concentrated amount.

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**4,517,097**

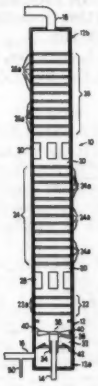
## PROCESS FOR DILUTING AQUEOUS POLYMER SOLUTIONS

**LaVaun S. Merrill, Jr., Englewood, Colo., assignor to Marathon Oil Company, Findlay, Ohio**

**Filed Feb. 16, 1984, Ser. No. 580,967**

**Int. Cl.³ C02F** *5/08*

**U.S. Cl. 210—696** **7 Claims**



1. A process for preventing, or at least substantially reducing, scaling in apparatus used for diluting an aqueous solution of a partially hydrolyzed polyacrylamide which solution contains scale forming substances, comprising the step of introducing carbon dioxide gas into the solution in an amount sufficient to maintain the pH of the solution at a level which acts to keep scale forming substances in solution during dilution.

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**4,517,098**

## METHOD OF DISPERSING INORGANIC MATERIALS IN AQUEOUS SYSTEMS WITH LOW MOLECULAR WEIGHT ACRYLIC ACID COPOLYMERS

**William M. Hann, Pennsburg; Jean DuPre, Levittown, and John Natoli, Ambler, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

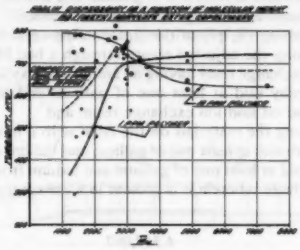
**Filed Apr. 15, 1983, Ser. No. 485,559**

**Int. Cl.³ C02F** *5/10*

**U.S. Cl. 210—701** **11 Claims**

1. A method for dispersing inorganic particulate matter and inhibiting the formation of hardness ion salt scale in aqueous systems comprising adding an effective scale inhibiting and particulate dispersant amount of a water soluble, low molecular weight copolymer formed from about 85 to about 97 weight percent acrylic acid and from about 15 to about 3 weight percent of a hydrophobic comonomer selected from the group

consisting of lower alkyl acrylates, having 2 to 8 carbon atoms in the alkyl group, and lower alkyl methacrylates, having 1 to



8 carbon atoms in the alkyl group to said aqueous systems, and where said copolymer has a weight average molecular weight of from about 2,000 to about 5,000.

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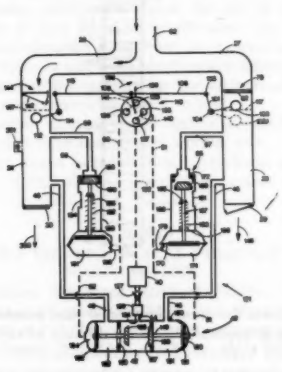
**4,517,099**

## APPARATUS AND METHOD FOR HANDLING SOLIDS IN LIQUID

**Raymond A. Breckner, 11360 Granville Ave., Richmond, British Columbia, Canada V6Y 1R6**

**Filed Oct. 7, 1983, Ser. No. 540,166**
**Int. Cl.³ B01D *21/24***
**U.S. Cl. 210—741** **14 Claims**



1. An apparatus for handling a solid/liquid mixture comprising solids carried in a liquid, the apparatus having a receiving chamber adapted to receive the mixture from a delivery duct and to hold the mixture temporarily, the chamber communicating with a low air pressure source or a vacuum source through a main directional valve, the chamber having an inlet valve communicating with the delivery duct to receive the mixture, an outlet valve to discharge the mixture from the chamber, an admitting valve to raise pressure in the chamber, and a quantity sensing means responsive to a predetermined quantity of mixture within the chamber, the apparatus being characterized by:

(a) the inlet valve being positioned adjacent an upper portion of the chamber above a maximum upper level of mixture within the chamber, and the chamber being connectable, as required, to the low pressure source to expose the inlet valve to a pressure difference so as to open the inlet valve and to draw the mixture therethrough,

(b) a riser means positioned upstream of the inlet valve and adapted to receive and to constrain the mixture to move initially upwardly prior to discharging through the inlet valve into the chamber, the riser means being shaped so as to cause solids, that might other wise tend to rest adjacent the inlet valve when the mixture flow therethrough ceases, to fall under gravity either forwardly through the inlet valve and into the chamber, or backwardly towards the mixture within the delivery duct,

(c) time delay means reponsive to the quantity sensing means to actuate the main directional valve when the predetermined quantity is attached to disconnect the vacuum source from the chamber, while concurrently permitting the mixture to continue to flow through the inlet valve under a gradually reducing pressure difference, so that flow through the inlet valve eventually ceases at a time when the maximum upper level is attained, prior to opening of the admitting valve to raise pressure in the chamber which closes the inlet valve, so as to provide time for solids to clear the inlet valve before closure thereof.

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**4,517,100**

## LUBRICATING WELLBORE FLUID AND METHOD OF DRILLING

**Weldon B. Nance, Lafayette, La., and Jack M. Calkins, Houston, Tex., assignors to Witco Chemical Corporation, New York, N.Y.**

**Filed Feb. 7, 1983, Ser. No. 464,631**
**Int. Cl.³ C09K *7/02, 7/06;* C10M *3/24, 3/32***
**U.S. Cl. 252—8.5 C** **20 Claims**

1. An aqueous wellbore fluid composition comprising water and as the sole lubricating component 0.5 to 5 volume % of a lubricant composition consisting of a mixture of:

(a) a chlorinated component of chlorinated normal paraffins having 9 to 20 carbon atoms, chlorinated esters of fatty acids, chlorinated waxes, chlorinated olefins or mixtures thereof, and

(b) a sulfurized component of sulfurized fatty acids, sulfurized esters of fatty acids, sulfurized polymerized fatty acids, sulfurized olefins or mixtures thereof,

in proportions to produce a lubricant composition containing 15 to 30 weight percent chlorine and 2 to 10 weight percent sulfur.

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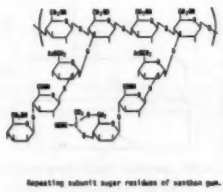
**4,517,101**

## REDUCED BIODEGRADABILITY IN A POLYMER FLOOD PROCESS

**David Williams, 2708 S. Elder St., and Douglas M. Munnecke, 2712 S. Elder St., both of Broken Arrow, Okla. 74012**

**Filed Aug. 22, 1983, Ser. No. 525,532**
**Int. Cl.³ E21B *43/22***
**U.S. Cl. 252—8.55 D** **5 Claims**



Repeating subunit sugar residues of xanthan gum.

1. In an enhanced oil recovery process, a method for modifying xanthan gum polymers to make them more resistant to bacterial enzymatic degradation, comprising

(a) methylating a xanthan gum polymer in an aqueous solution, and

(b) recovering the methylated polymer.

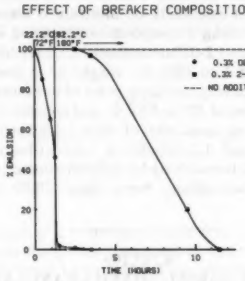
2. A process of enhanced oil recovery of a micellar polymer flood type wherein the biodegradability of the polymer is suppressed by the use of a methylated xanthan gum in the polymer flood.

**4,517,102**

## METHOD OF BREAKING AN EMULSION AND AN EMULSION-EMULSION BREAKER COMPOSITION

**William M. Salathiel, Houston, Tex., assignor to Exxon Production Research Co., Houston, Tex.**

**Filed Jun. 30, 1980, Ser. No. 164,703**
**Int. Cl.³ C09K *3/00***
**U.S. Cl. 252—8.55 R** **25 Claims**




**1.** A method of treating a subterranean formation, said method comprising the steps of:

(a) preparing an emulsion comprising water, oil, a surfactant and an ester, said ester comprising an emulsion breaker group bonded to a protecting group by an ester bond, said emulsion breaker group being selected from the group consisting of alkylbenzenesulfonic acid esters and alkylbenzenephosphoric acid esters wherein the alkyl group has between 4 and 18 carbon atoms and sulfate esters of ethoxylated alcohols and alkylphenols wherein the alkyl group has between 4 and 24 carbon atoms, said protecting group being selected from the group consisting of methyl, ethyl, propyl, butyl and compounds represented by the formula

$$\left(CH_2-\underset{\displaystyle C_lH_{2l+1}}{\underset{|}{CH}}-O\right)_m H$$

wherein m=1, 2, or 3 and l=0, 1, or 2 and said ester bond being adapted to hydrolyze and release said emulsion breaker group from said protecting group at the temperature of said subterranean formation;

(b) injecting said emulsion into said subterranean formation; and

(c) permitting said ester bond to hydrolyze, thereby releasing said emulsion breaker group from said protecting group and resulting in the breaking of said emulsion.

**21.** A composition of matter for treating subterranean formations which comprises a water-in-oil emulsion comprising an internal aqueous phase and an external oil phase, said external oil phase comprising a blend of liquid hydrocarbon, a surfactant and an ester, said ester comprising an emulsion breaker group bonded to a protecting group by an ester bond, said emulsion breaker group being selected from the group consisting of alkylbenzenesulfonic acid esters and alkylbenzenephosphoric acid esters wherein the alkyl group has between 4 and 18 carbon atoms, said protecting group being selected from the group consisting of methyl, ethyl, propyl, butyl and compounds represented by the formula

$$\left(CH_2-\underset{\displaystyle C_lH_{2l+1}}{\underset{|}{CH}}-O\right)_m H$$

wherein m=1, 2, or 3 and l=0, 1, or 2, and said ester bond being adapted to hydrolyze and release said emulsion breaker group from said protecting group at the temperature of said subterranean formation, said external oil phase comprising between about 3 and 50 volume percent of said emulsion, said surfactant comprising between about 0.5 and 40 weight percent of said external oil phase, and said ester being incorporated in sufficient amount so that upon hydrolyzing, said emulsion will break.

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**4,517,103**

## LUBRICATING COMPOSITIONS CONTAINING 5,5'-DITHIOBIS(1,3,4-THIADIAZOLE-2-THIOL)

**David M. Hoffman, Weston; John J. Feher, Milford, and Homer H. Farmer, Westport, all of Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.**

**Filed Apr. 18, 1983, Ser. No. 485,817**
**Int. Cl.³ C10M *5/22***
**U.S. Cl. 252—28** **4 Claims**

**1.** A lubricating composition comprising a major amount of an oil of lubricating viscosity wherein said oil is a petroleum hydrocarbon oil or a synthetic oil and dispersed therein from about 0.1 to 10 percent of 5,5'-dithiobis(1,3,4-thiadiazole-2-thiol).

**2.** A process for preparation of a lubricating composition by forming a mixture of an oil of lubricating viscosity, thickener and grease forming additives, the improvement of which comprises the steps of:

(1) adding to the mixture from about 0.1 to 10 percent 5,5'-dithiobis(1,3,4-thiadiazole-2-thiol);

(2) agitating to a homogeneous mixture; and

(3) milling to a grease consistency.

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**4,517,104**

## ETHYLENE COPOLYMER VISCOSITY INDEX IMPROVER-DISPERSANT ADDITIVE USEFUL IN OIL COMPOSITIONS

**Ricardo Bloch, Scotch Plains; Thomas J. McCrary, Jr., Plainfield, and Darrell W. Brownawell, Scotch Plains, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed May 6, 1981, Ser. No. 260,883**
**Int. Cl.³ C10M *1/32, 1/40, 1/20***
**U.S. Cl. 252—51.5 A** **33 Claims**

**1.** Oil soluble reaction product, useful as a V.I.-dispersant for lubricating oil, comprising the reaction product of:

(a) an oil soluble ethylene copolymer comprising within the range of about 15 to 90 wt. % ethylene and about 10 to 85 wt. % of one or more $C_3$ to $C_{28}$ alpha-olefin, having a number average molecular weight within a range of about 5,000 to 500,000 and grafted with an ethylenically unsaturated carboxylic acid material having 1 to 2 carboxylic acid groups or anhydride groups;

(b) an alkylene or oxyalkylene amine having at least two primary amine groups selected from the group consisting of alkylene polyamines having alkylene groups of about 2 to 7 carbon atoms and 2 to 11 nitrogens, and polyoxyalkylene polyamines, wherein the alkylene groups contain 2 to 7 carbon atoms and the number of oxyalkylene groups will be about 3 to 70; and,

(c) a long chain hydrocarbyl substituted succinic anhydride or acid having 50 to 400 carbon atoms.

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**4,517,105**

## METALWORKING LUBRICANT COMPOSITION CONTAINING A NOVEL SUBSTITUTED MALONIC ACID DIESTER

**Joseph T. Laemmle, Delmont, and John Bohaychick, New Kensington, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Filed Mar. 7, 1983, Ser. No. 472,585**
**Int. Cl.³ C10M *1/26***
**U.S. Cl. 252—56 R** **19 Claims**

**1.** A metalworking lubricant composition comprising

(a) a minor proportion of a substituted malonic acid diester

having the formula $R_1R_2C(COOR_3)(COOR_4)$, wherein $R_1$ is a $C_8$–$C_{30}$ alkyl aryl group; $R_2$ is H or a $C_1$–$C_{18}$ linear alkyl group or a $C_8$–$C_{30}$ branched alkyl group or a $C_8$–$C_{30}$ alkyl aryl group; and $R_3$ and $R_4$ are $C_1$–$C_4$ linear or branched alkyl groups and

(b) a major proportion of mineral oil, said substituted malonic acid diester constituting an additive dissolved in said mineral oil.

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**4,517,106**

## SOLUBLE SURFACTANT ADDITIVES FOR AMMONIUM FLUORIDE/HYDROFLUORIC ACID OXIDE ETCHANT SOLUTIONS

**Ronald J. Hopkins, Orchard Park; Evan G. Thomas, East Aurora, and Harold J. Kieta, Buffalo, all of N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Filed Apr. 26, 1984, Ser. No. 604,112**

**Int. Cl.³ C09K** *13/06, 13/08;* **B44C** *1/22;* **C03C** *15/00*

**U.S. Cl. 252—79.4** **10 Claims**

1. An etching solution containing a surfactant which is stable against precipitation of the surfactant comprising an aqueous mixture of ammonium fluoride and surfactant that contains between 13.5 and 45 weight percent ammonium fluoride ($NH_4F$) and between 25 and 20,000 ppm of a fluoroalkylsulfonate surfactant of the formula

$$XF_2C(CFY)_nSO_3A$$

wherein n has a value of up to 12, the carbon chain may be linear or branched, X may be F, OH, or $SO_3A$, Y may be F, H, OH or be omitted and A may be $H^+$, $NH_4^+$, $Na^+$, $K^+$, $Li^+$, $R^+$ or $NR_4^+$ wherein R is a 1 to 4 carbon atom alkyl group and mixtures thereof and the remainder being water.

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**4,517,107**

## DETERGENT BAR

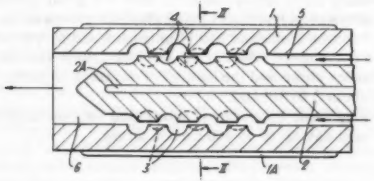
**Terence A. Clarke; Richard B. Edwards, and Graeme N. Irving, all of Wirral, England, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of Ser. No. 479,630, Mar. 28, 1983, abandoned. This application Mar. 14, 1984, Ser. No. 587,876**

**Claims priority, application United Kingdom, Mar. 29, 1982, 8209148; Jan. 24, 1983, 8301905**

**Int. Cl.³ B01F** *7/02;* **B29B** *1/06;* **C11D** *13/10, 17/00*

**U.S. Cl. 252—108** **5 Claims**




1. The process of increasing the transparency of soap-containing detergent material in which shear sensitive soap-containing material is subjected to working by passing the material between two closely spaced mutually displaceable surfaces each having a pattern of cavities which overlap during movement of the surfaces so that the material moved between the surfaces traces a path through cavities alternately in each surface, whereby the bulk of the material passes through the shear zone in the material generated by displacement of the surfaces.

**4,517,108**

## CLEANING COMPOSITION

**Iwao Hisamoto, Suita; Yukio Omure, Takatsuki, and Sueyoshi Ishikawa, Kishiwada, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan**

**Filed Sep. 23, 1983, Ser. No. 535,095**

**Claims priority, application Japan, Sep. 27, 1982, 57-169118**

**Int. Cl.³ C11D** *7/30*

**U.S. Cl. 252—162** **5 Claims**

1. A method for cleaning a surface of a material with the improvement that essentially no moisture is formed over the cleaned surface, using a composition consisting essentially of 1,1,2,2-tetrachloro-1,2-difluoroethane, 1,1,2-trichloro-1,2,2-trifluoroethane and 1 to 15% by weight of at least one other organic solvent having a melting point of not more than 15° C. and a boiling point of 40° to 150° C. and capable of forming an azeotrope with at least one of said 1,1,2,2-tetrachloro-1,2-difluoroethane and 1,1,2-trichloro 1,2,2-trifluoroethane, the ratio of 1,1,2,2-tetrachloro-1,2-difluoroethane to 1,1,2-trichloro-1,2,2-trifluoroethane being from 20:80 to 80:20 by weight.

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**4,517,109**

## PROCESS FOR MAKING MIXED GRANULATES FROM CONDENSED PHOSPHATES AND BUILDER SALTS

**Karl Merkenich, Rimbach; Horst-Dieter Wasel-Nielen, Hürth; Alexander Maurer, Hürth, and Renate Adrian, Hürth, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation of Ser. No. 359,380, Mar. 18, 1982, abandoned. This application Oct. 14, 1983, Ser. No. 542,075**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1981, 3111617**

**Int. Cl.³ C11D** *3/06, 7/16*

**U.S. Cl. 252—135** **6 Claims**

1. A process for making granulates from a mixture consisting essentially of water-soluble condensed phosphates of the following general formula (I)

$$M_2O(MPO_3)_n \quad (I)$$

in which M stands for sodium, potassium or ammonium and n stands for a number between 4 and about 100, and at least one builder salt for detergent or cleaning compositions by subjecting the said mixture to granulation in the presence of water, the process which comprises the steps:

(a) carrying out the granulation with a granulation aid consisting essentially of an ammonium polyphosphate corresponding to the following general formula (II)

$$H_{(n-m)+2}(NH_4)_mP_nO_{3n+1} \quad (II)$$

in which n stands for an integral average value of 3 to 1000, m stands for a whole number of most n+2, and m/n is between 1.0 and 1.67;

(b) selecting the builder salt from the group consisting of alkali metal salts of nitrilotriacetic acid, poly-α-hydroxyacrylic acid and polyacrylic acid, the latter having a molecular weight of about 2000 to 30 000;

(c) granulating a mixture corresponding essentially of the condensed phosphate (I), the said builder salt and the ammonium polyphosphate (II) by placing this mixture on a rotating plate and spraying water on to this mixture or granulating a mixture consisting essentially of the condensed polyphate (I) and the said builder salt by placing this mixture on a rotating plate and spraying an aqueous solution or suspension of the ammoniumpolyphosphate (II) on to the mixture;

(e) the builder salt being used in a proportion of about 5 up to 100 weight %, the ammonium polyphosphate (II) in a proportion of about 0.003 to 1 weight % and the water in a proportion of about 0.5 to 10 weight % , the percentages being based on the quantity of condensed phosphate (I).

**4,517,110**

## RUST PREVENTIVE AGENT OF HYDROXYPOLYBASIC ACID SALT TYPE

**Hiroshi Suzuki; Yasuo Gama, and Shoji Miyazaki, all of Higashi, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan**

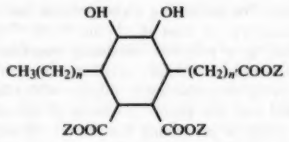
**Filed Nov. 15, 1983, Ser. No. 551,728**

**Claims priority, application Japan, Nov. 15, 1982, 57-200181**

**Int. Cl.³ C02F** *5/10;* **C07C** *61/09, 62/04;* **C23F** *11/12*

**U.S. Cl. 252—180** **7 Claims**

1. A rust preventive agent comprising salt of hydroxycarboxylic acid represented by the general formula;




wherein n and n' are integers from 4 to 10, and each Z is selected from the group consisting of hydrogen, lower alkyl group, alkali metal, or ammonium ion, which may be either the same or different from each other, at least one of Zs being alkali metal or ammonium ion.

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**4,517,111**

## ABSORBENTS FOR AIRBORNE FORMALDEHYDE

**Linneaus C. Dorman, and Vernon A. Stenger, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jan. 16, 1984, Ser. No. 571,039**

**Int. Cl.³ C09K** *3/00*

**U.S. Cl. 252—186.25** **16 Claims**

8. A method for decreasing the amount of formaldehyde present in an atmosphere comprising:

exposing to said atmosphere a composition formed from a solid alkaline support portion, and a permanganate salt portion in an amount of from about 0.1 to about 10.0 percent per total weight of said solid alkaline support adsorbed or chemisorbed onto the surface of said solid alkaline support.

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**4,517,112**

## MODIFIED ORGANOPHILIC CLAY COMPLEXES, THEIR PREPARATION AND NON-AQUEOUS SYSTEMS CONTAINING THEM

**Wilbur S. Mardis, Trenton, N.J., and Claude M. Finlayson, Houston, Tex., assignors to NL Industries, Inc., New York, N.Y.**

**Filed Feb. 18, 1982, Ser. No. 348,641**

**Int. Cl.³ B01J** *13/00*

**U.S. Cl. 252—315.2** **24 Claims**

1. An organophilic clay gellant useful for gelling organic liquids which comprises the reaction product of:

(a) a smectite-type clay having a cation exchange capacity of at least 75 milliequivalents per 100 grams of said clay;

(b) a primary anion selected from the group consisting of anions derived from organic sulfonic acids, alkylsulfates and mixtures thereof containing at least one lineal or branched alkyl group having greater than 9 carbon atoms, aromatic sulfonic acids and mixtures thereof;

(c) a secondary anion different from said primary anion and selected from the group consisting of anions derived from organic acids having pKa of less than about 11.0 and mixtures thereof; and

(d) an organic cation in an amount sufficient to satisfy the cation exchange capacity of said clay and the cationic activity of the primary and secondary anions wherein the resulting organic cation—organic anion complexes are intercalated with the smectite-type clay and wherein the combination of said primary and secondary anions increases the ease of dispersion of said organophilic clay gellant in an organic liquid to a degree greater than an equivalent amount of either the primary or secondary anion alone.

22. A non-aqueous fluid system which comprises a non-aqueous fluid composition and a self-activating organophilic clay rheological composition useful as an additive for non-aqueous fluid systems which comprises: the reaction product of an organic cation, a primary anion selected from the group consisting of anions derived from organic sulfonic acids, alkylsulfates and mixtures thereof, a secondary anion different from said primary anion and selected from the group consisting of anions derived from organic acids having a $pK_A$ of less than about 11.0 and mixtures thereof and a smectite-type clay having a cation exchange capacity of at least 75 milliequivalents per 100 grams of said clay such that organic cation—organic anion complexes are present which are intercalated with the smectite-type clay and the cation exchange sites of the smectite-type clay are substituted with the organic cation wherein the amount of organic cation present is at least (100+n) milliequivalents where n is the amout of the primary anion expressed in milliequivalents per 100 grams of clay, 100% clay basis wherein the combination of said primary and secondary anions increases the ease of dispersion of said organophilic clay rheological composition in an organic liquid to a degree greater than an equivalent amount of either the primary or secondary anion alone.

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**4,517,113**

## PROCESS FOR REMOVAL OF UNREACTED OIL FROM SURFACTANT SLURRY

**Hideo Ando, Katsushika; Kentaro Kiyama, Chofu, and Kyozo Kitano, Narashino, all of Japan, assignors to Lion Corporation, Tokyo, Japan**

**Filed Nov. 29, 1983, Ser. No. 556,224**

**Claims priority, application Japan, Sep. 12, 1982, 57-214618**

**Int. Cl.³ B01D** *3/10;* **B01F** *17/02;* **C07C** *143/02*

**U.S. Cl. 252—353** **4 Claims**

1. A process for removing unreacted oil from a surfactant slurry containing the same comprising:

continuously feeding steam from one side of a pressure vessel into an anionic surfactant slurry containing unreacted oil in the pressure vessel while maintaining a pressure in the system of at least 5 $kg/cm^2$; and

simultaneously discharging the anionic surfactant slurry from the other side of the pressure vessel into a low pressure region to effect vaporization of the unreacted oil from the anionic surfactant slurry.

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**4,517,114**

## INHIBITORS AGAINST CORROSION CAUSED BY $CO_2$ AND $H_2S$ IN WATER-IN-OIL EMULSIONS

**Knut Oppenlaender, Ludwigshafen; Karl Stork, Lampertheim, and Klaus Barthold, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Aug. 26, 1983, Ser. No. 526,614**

**Claims priority, application Fed. Rep. of Germany, Sep. 4, 1982, 3232921**

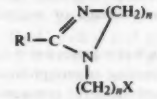
**Int. Cl.³ C09K** *3/00;* **C23F** *11/00*

**U.S. Cl. 252—389 R** **4 Claims**

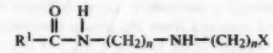
1. An inhibitor against corrosion caused by $CO_2$ and $H_2S$ in water-in-oil emulsions comprising a mixture of

(A) a compound selected from the group consisting of

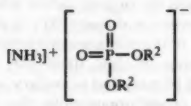
(i) a compound or salt thereof having the formula



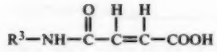
(ii) a precursor of (i) having the formula



in which
$R^1 = C_6$ to $C_{22}$ alkyl or alkenyl;
X = —OH, $—NH_2$ or



$R^2 = C_4$ to $C_{18}$ alkyl, n = 2 or 3; and
(B) a maleinamidic acid having the formula



in which $R^3$ is a saturated or unsaturated $C_8$ to $C_{22}$ alkyl, wherein the ratio of A:B is from 1:4 to 4:1.

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**4,517,115**

## SYNERGISTIC VINYL HALIDE STABILIZER COMPOSITIONS OF ANTIMONY ORGANIC SULFUR-CONTAINING COMPOUNDS, ALKALINE EARTH CARBOXYLATES, AND ALKALI METAL CARBONATES

**Dale J. Dieckmann, Cleveland, and Charles W. Fletcher, Highland Heights, both of Ohio, assignors to Plastic Specialties and Technologies, Inc., Cleveland, Ohio**

**Division of Ser. No. 176,473, Aug. 8, 1980, Pat. No. 4,440,674. This application Sep. 30, 1982, Ser. No. 431,580**
**The portion of the term of this patent subsequent to Apr. 3, 2001, has been disclaimed.**
**Int. Cl.³ C09K *15/32***
**U.S. Cl. 252—400 R** **9 Claims**

1. A vinyl halide resin stabilizer composition which consists essentially of,

an antimony organic sulfur-containing compound having an Sb—S group, and mixtures thereof,

a metal carboxylate selected from the group consisting of an alkaline earth metal salt of a carboxylic or thiocarboxylic acid, and mixtures thereof, and

an alkali metal carbonate, said antimony compound, metal carboxylates and carbonate components in relative amounts which together provide a synergistic stabilizing effectiveness upon said resin.

**4,517,116**

## ELECTRICALLY CONDUCTING COMPOSITIONS OF DOPED POLYPHENYLENES AND SHAPED ARTICLES COMPRISING THE SAME

**Dawn M. Ivory, Stanhope; Granville G. Miller, Morristown; Ronald R. Chance, and Ray H. Baughman, both of Morris Plains, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.**

**Division of Ser. No. 234,511, Feb. 17, 1981, Pat. No. 4,440,669, which is a continuation-in-part of Ser. No. 022,237, Mar. 20, 1979, abandoned. This application Jan. 9, 1984, Ser. No. 569,426**
**Int. Cl.³ H01B *1/00***
**U.S. Cl. 252—500** **8 Claims**

1. A process for producing a composition having a direct current conductivity at least $10^{-3}$ ohm$^{-1}$ cm$^{-1}$ which comprises contacting a polymer consisting essentially of units having paraphenylene linkages or of mixtures of such units with units having meta-phenylene linkages with a halogenating agent selected from the group consisting of chlorine, fluorine and mixed halogens containing fluorine or chlorine or both, and annealing the resulting composition at temperatures at least 200° C. and not exceeding 800° C.

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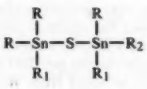
**4,517,117**

## STABILIZERS FOR CED COMPOSITIONS

**Mohamed E. Labib, Princeton, and Chin C. Wang, Hightstown, both of N.J., assignors to RCA Corporation, Princeton, N.J.**

**Filed Jun. 20, 1984, Ser. No. 622,648**
**Int. Cl.³ H01B *1/06***
**U.S. Cl. 252—511** **18 Claims**

1. In a conductive molding composition for a capacitive electronic disc comprising from about 70 to about 85 percent by weight of a thermoplastic resin selected from the group consisting of: a homopolymer or copolymer of vinyl chloride, or a mixture thereof; and a homopolymer of styrene or an acrylic monomer, or their copolymers, from about 12 to about 20 percent by weight of finely divided conductive carbon black, from about 1 to about 5 percent by weight of compatible stabilizers, from about 0.5 to about 3 percent by weight of compatible lubricants, from about 1 to about 5 percent by weight of compatible plasticizers, and from 0 to about 4 percent by weight of compatible modifiers, the improvement wherein said stabilizer comprises at least one compound selected from those represented by the formulae



and

wherein R is a straight-chain alkyl radical having from 4 to 8 carbon atoms;

$R_1$ is —S—$CH_2$—$COOR_3$ or —S—$R_3$;

$R_2$ is R or $R_1$; and

$R_3$ is a straight-chain alkyl radical having from 8 to 18 carbon atoms.

**4,517,118**

## NEW NICKEL COATING COMPOSITION FOR SHIELDING ELECTRONIC EQUIPMENT AND THE LIKE

**Steven R. Stoetzer, Port Huron, Mich., assignor to Acheson Industries, Inc., Port Huron, Mich.**

**Filed Jun. 27, 1983, Ser. No. 508,285**
**Int. Cl.³ H01B 1/02**
**U.S. Cl. 252—513** **16 Claims**

1. A new nickel-containing composition which is liquid when applied to a substrate, and forms a shielding coating on the substrate, said composition being comprised of:

(a) a nickel pigment material, said pigment being finely particulated and having an average particle size of about 10 microns or less,

(b) a ferro alloy pigment material which is selected from at least one of the group consisting of ferrophosphorous, ferromanganese, ferromolybdenum, ferrosilicon, ferrochrome, ferrovanadium, ferrozirconium, ferrotitanium, ferrotungsten, ferroboron and ferrocarbide,

said ferro alloy pigment material is present in amount of about 5% to about 90% by weight of the total solids, said ferro alloy pigment material has an average particle size of less than about 70 microns,

(c) a binder resin which is selected from at least one of the group consisting of aqueous silicate solutions, thermoplastic acrylic, vinyl, urethane, alkyd, polyester, hydrocarbon, fluoroelastomer and cellulosic resins, and thermosetting acrylic, polyester, epoxy, phenolic, urethane and alkyd resins,

(d) the pigment to binder weight ratio in said composition being between about 10 to 1 and about 3 to 1, and

(e) said composition containing a weight percent total solids from about 30% to about 85%, and a solvent carrier for the composition being used as required.

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**4,517,119**

## SYNTHESIS OF THYMOSIN $\alpha_1$

**Arthur M. Felix, West Caldwell, N.J.; Dieter Gillessen, Pratteln; William Lergier, Kaiseraugst, both of Switzerland; Johannes A. Meienhofer, Upper Montclair, N.J., and Arnold Trzeciak, Schopfheim, Fed. Rep. of Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Apr. 4, 1983, Ser. No. 482,113**
**Int. Cl.³ C07C 103/52**
**U.S. Cl. 260—112.5 R** **2 Claims**

1. A compound of the formula Z-Thr(tBu)-Ser(tBu)-Ser(tBu)-Glu(OtBu)-Ile-Thr(tBu)-Thr(tBu)-Lys(Boc)-Asp(OtBu)-Leu-Lys(Boc)-Glu(OtBu)-Lys(Boc)-Lys(Boc)-GLu(OtBu)-Val-Val-Glu(OtBu)-Glu(OtBu)-Ala-Glu(OtBu)-Asn-OtBu, wherein Z is benzyloxycarbonyl, Boc is t-butyloxycarbonyl and tBu is t-butyl.

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**4,517,120**

## COFFEE OIL TREATMENT

**Rathindra N. Roychoudhury, Marysville, Ohio, assignor to Nestec, S.A., Vevey, Switzerland**

**Filed Oct. 19, 1983, Ser. No. 543,401**
**Int. Cl.³ C07G 17/00**
**U.S. Cl. 426—655** **6 Claims**

1. A process for reducing the cafestol content of coffee oil while retaining oxidative stability consisting essentially of:

(a) heating the coffee oil to a temperature of from 150° C. to 270° C. for a period of from 1 minute to 6 hours;

(b) sufficiently cooling the heated coffee oil to permit the addition of isopropanol;

(c) extracting the cooled coffee oil with an aqueous isopropanol solution containing at least 50% by weight of isopropanol; and then

(d) separating the extracted coffee oil from the aqueous isopropanol layer.

**4,517,121**

## METHOD OF INCREASING THE SUPRACONDUCTIVE CRITICAL TEMPERATURE IN QUASI UNIDIMENSIONAL ORGANIC SUPRACONDUCTORS AND NEW SUPRACONDUCTIVE COMPOUNDS THUS OBTAINED

**Denis Jerome, Jouy en Josas; Claude More, Vaison la Romaine; Guy-Roland Roger, Plan de Cuques; Jean-Pierre Sorbier, Marseilles; Jean-Marc Delrieu, Gif sur Yvette; Michel Ribault, Bures sur Yvette; Jean M. Fabre, Montpellier; André Fournel, St. Savournin; Louis Giral, Montpellier, all of France, and Klaus Bechgaard, Aabovaenge, Denmark, assignors to Centre National de la Recherche Scientifique, Paris, France**

**PCT No. PCT/FR82/00123, § 371 Date Mar. 22, 1983, § 102(e) Date Mar. 22, 1983, PCT Pub. No. WO83/00410, PCT Pub. Date Feb. 3, 1983**
**PCT Filed Jul. 21, 1982, Ser. No. 479,068**
**Claims priority, application France, Jul. 22, 1981, 81 14291**
**Int. Cl.³ C07F 9/90, 5/06, 7/24, 1/12**
**U.S. Cl. 260—239 R** **6 Claims**

1. A process for increasing the critical supraconductive temperature of the organic molecular crystalline compound $(TMTSF)_2X$ in which TMTSF is di-$\Delta^{2,2'}$-bi-4,5-dimethyl-1,3-diselenol and X is $ClO_4$, $PF_6$, $TaF_6$, $SbF_6$, $AsF_6$ or $ReO_4$ comprising cross-linking the chains of the crystalline compound with at least one metal selected from gold, silver, aluminum, lead, indium, gallium or selenium.

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**4,517,122**

## CYCLIC PEPTIDES

**Donald A. Tomalia, and Larry R. Wilson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Feb. 12, 1982, Ser. No. 348,528**
**Int. Cl.³ C07D 210/00, 103/52; C07C 103/52**
**U.S. Cl. 260—239.3 R** **5 Claims**

1. A cyclic peptide corresponding to the formula

$$—NHCRHCRHNHCH_2CR'HC(O)—_2$$

wherein R and R' independently each occurrence are hydrogen or $C_{1-4}$ alkyl.

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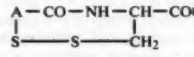
**4,517,123**

## CYSTEINE DERIVATIVES OF DISULFIDE FORM

**Tadashi Iso, Sakai, and Masayuki Oya, Ibaraki, both of Japan, assignors to Santen Pharmaceutical Co., Ltd., Osaka, Japan**

**PCT No. PCT/JP81/00235, § 371 Date May 4, 1982, § 102(e) Date May 4, 1982, PCT Pub. No. WO82/01000, PCT Pub. Date Apr. 1, 1982**
**PCT Filed Sep. 18, 1981, Ser. No. 380,665**
**Claims priority, application Japan, Sep. 20, 1980, 55-131349**
**Int. Cl.³ C07D 210/00; C07C 153/017, 147/02, 101/42**
**U.S. Cl. 260—239.3 R** **9 Claims**

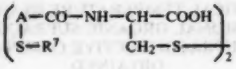
1. A compound of the formula



wherein

A is a straight or branched alkylene group containing 1 to 3 carbon atoms, and pharmaceutically acceptable salts thereof.

2. A compound of the formula



wherein

A is a straight or branched alkylene group containing 1 to 3 carbon atoms; and

$R^7$ is a lower alkyl group, and pharmaceutically acceptable salts thereof.

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**4,517,124**

## PROCESS FOR PREPARING PENEM DERIVATIVES

**Nigel J. P. Broom, Reigate, England, assignor to Beecham Group Limited, England**

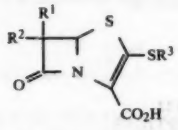
**Continuation of Ser. No. 291,389, Aug. 10, 1981, abandoned. This application Nov. 14, 1983, Ser. No. 550,968**

**Claims priority, application United Kingdom, Aug. 16, 1980, 8026733; European Pat. Off., Apr. 15, 1981, 81301683**

**Int. Cl.³ C07D *499/00*; A61K *31/425***

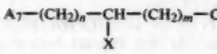
**U.S. Cl. 260—245.2 R** **7 Claims**

1. A process for the preparation of a 2-thio penem derivative of formula (IV) or a pharmaceutically acceptable salt or in vivo hydrolysable ester thereof:



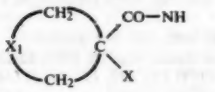
(IV)

wherein $R^1$ and $R^2$ are independently hydrogen; substituted or unsubstituted: $C_{1-10}$ alkyl, alkenyl and alkynyl having from 2–10 carbon atoms; cycloalkyl, cycloalkylalkyl, and alkylcycloalkyl, having 3–6 carbon atoms in the cycloalkyl ring and 1–6 carbon atoms in the alkyl moieties thereof; phenyl; aralkyl, aralkenyl, and aralkynyl wherein the aryl moiety is phenyl and the linear chain has 1–6 carbon atoms; wherein the substituent or substituents relative to the above named radicals are selected from the group consisting of: amino, alkanoylamino, mono- and di-alkylamino, hydroxyl, alkoxyl, alkanoyloxy, mercapto, alkylthio, phenylthio, sulfamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, cyano and carboxy, and wherein the alkyl moieties of the above-recited substituents have 1–6 carbon atoms; a free hydroxy or mercapto group; an amino or acylamino group of formula (d), (e), (f) or (g):

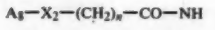


(d)

(e)

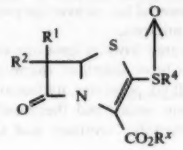


(f)



(g)

wherein n is 0, 1 or 2; m is 0, 1 or 2; $A_7$ is an alkyl group of 1–6 carbon atoms, a cycloalkyl group of 3–6 carbon atoms, cyclohexenyl, cyclohexadienyl, phenyl, hydroxyphenyl, thienyl or pyridyl group; x is a hydrogen, bromine or chlorine atom, a carboxylic acid, carboxylate ester, hydroxy, acetoxy, amino, ureido, guanidino or acetylureido group; $A_8$ is a phenyl, 2,5-dimethoxyphenyl, 2-alkoxy-1-naphthyl, isothiazolyl, 3-phenyl-5-methyl-4-isoxazolyl, 3-o-chlorophenyl-5-methyl-4-isoxazolyl, 3-o,o-dichlorophenyl-5-methyl-4-isoxazolyl, 3-o,o-fluorochlorophenyl-5-methyl-4-isoxazolyl, 3-phenyl-4-isoxazolyl, 3-o-chlorophenyl-4-isoxazolyl, 3-o,o-dichlorophenyl-4-isoxazolyl, 3-o,o-fluorochlorophenyl-4-isoxazolyl group wherein the aryl moiety is phenyl unsubstituted or substituted by up to two halo atoms; $X_1$ is a $CH_2OCH_2$, $CH_2SCH_2$ or $(CH_2)_n$ group; and $X_2$ is an oxygen or sulphur atom; or together $R^1$ and $R^2$ represent a group $=CR^5R^6$ wherein $R^5$ and $R^6$ are the same or different and each represents hydrogen or a $C_{1-10}$ hydrocarbon group; and $R^3$ represents an organic radical having up to 18 carbon atoms selected from a saturated or unsaturated aliphatic, cycloaliphatic, cycloaliphaticaliphatic, phenyl or aralkyl, wherein the aryl moiety is phenyl and the alkyl part has 1–6 carbon atoms, or a heterocyclyl or heterocyclyl-alkyl radical having up to 10 carbon atoms and up to 4 ring hetero atoms selected from the group nitrogen, oxygen and/or sulphur, any of which $R^3$ groups may be optionally substituted by amino, mono-, di- and tri-($C_{1-6}$) alkylamino, $C_{1-6}$ alkanoylamino, hydroxyl, $C_{1-6}$ alkylthio, phenylthio, sulfamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, cyano, carboxyl, $C_{1-6}$ alkoxycarbonyl, and $C_{1-6}$ alkanoyloxy which process comprises reacting a sulphoxide of formula (V):



(V)

wherein $R^1$ and $R^2$ are as defined with respect to formula (IV) above, $R^x$ represents hydrogen or a salt, ester or anhydride of the carboxylic acid group which may be readily cleaved under conventional conditions, and $R^4$ is an organic radical as defined in relation to $R^3$ in formula (IV) provided that $R^4$ is different to $R^3$; with a thiol of formula (VI) or a reactive salt thereof:

$$R^3—SH \qquad \text{(VI)}$$

and thereafter if necessary carrying out one or more of the following steps:

(i) removal of any carboxyl-blocking group $R^x$;

(ii) converting the product to a pharmaceutically acceptable salt or in vivo hydrolysable ester group.

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**4,517,125**

## NOVEL VITAMIN $D_3$ DERIVATIVES AND PROCESS FOR PRODUCING THE SAME

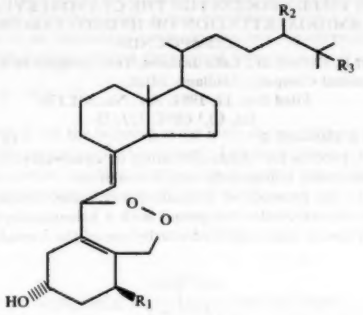
**Hiroaki Takayama; Sachiko Yamada; Keiko Nakayama, and Tatsuo Suda, all of Tokyo, Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 3, 1983, Ser. No. 463,616**

**Int. Cl.³ C07J *9/00***

**U.S. Cl. 260—397.2** **4 Claims**

1. A 6,19-epidioxyvitamin $D_3$ derivative of the formula:



(wherein $R_1$, $R_2$ and $R_3$ are each a hydrogen atom or a hydroxyl group; when $R_1$ is a hydrogen atom, $R_2$ represents a hydroxyl group and $R_3$ is a hydrogen atom or a hydroxyl group; when both $R_1$ and $R_2$ represent a hydroxyl group, $R_3$ is a hydrogen atom or a hydroxyl group; and when $R_1$ is a hydroxyl group and $R_2$ is a hydrogen atom, $R_3$ represents a hydroxyl group).

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**4,517,126**

## PENICILLANIC ACID DERIVATIVE

**Michael S. Kellogg, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Continuation of Ser. No. 96,832, Nov. 23, 1979, , which is a continuation-in-part of Ser. No. 17,809, Mar. 5, 1979, abandoned. This application Apr. 11, 1983, Ser. No. 483,921**

**Int. Cl.**[3] **C07D** *499/00;* **A61K** *31/425*

**U.S. Cl. 260—245.2 R** **1 Claim**

1. The compound 6-$\beta$-bromo penicillanic acid pivaloyloxymethyl ester substantially free of the corresponding 6-$\alpha$-isomer.

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**4,517,127**

## $\beta$-LACTAM DERIVATIVES AND PROCESS FOR PRODUCTION THEREOF

**Takeo Yoshioka, Ayase; Kenichi Yamamoto, Fujisawa; Yasuo Fukagawa, Kamakura; Yasutaka Shimauchi, Kanagawa, and Tomoyuki Ishikura, Chigasaki, all of Japan, assignors to Sanraku-Ocean Co., Ltd., Tokyo, Japan**

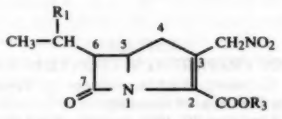
**Filed Dec. 9, 1983, Ser. No. 559,681**

**Claims priority, application Japan, Dec. 10, 1982, 57-215539**

**Int. Cl.**[3] **C07D** *487/04;* **A61K** *31/40*

**U.S. Cl. 260—245.2 T** **3 Claims**

1. A compound represented by the following formula:



wherein $R_1$ represents hydrogen or hydroxyl and $R_3$ represents hydrogen, lower alkyl or lower alkyl substituted by 1 to 3 phenyl groups which phenyl groups are unsubstituted or are substituted by at least one substituent selected from halogen, lower alkyl, lower alkoxy, phenoxy, lower haloalkyl, $C_1$–$C_{10}$ alkanoyloxy, benzoyloxyl, lower alkanoylamino, benzoylamino, carboxy, lower alkoxycarbonyl, hydroxy, and nitro.

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**4,517,128**

## TWO-TAILED SURFACTANTS HAVING ONE AROMATIC CONTAINING TAIL AND THEIR USE IN CHEMICAL WATERFLOODING

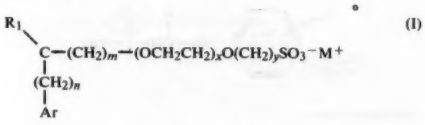
**Kirk D. Schmitt, Pennington, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 31, 1982, Ser. No. 413,576**

**Int. Cl.**[3] **C07C** *141/02, 143/42*

**U.S. Cl. 260—458 C** **4 Claims**

1. A compound of the formula



(I)

where:

(i) n and m are from 0 to 3;

(ii) y is from 0 to 5;

(iii) x is a rational number from 2 to 8;

(iv) $R_1$ is $C_4$–$C_{10}$ alkyl;

(v) Ar is substituted or unsubstituted phenyl; and

(vi) M is a cation.

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**4,517,129**

## PROCESS FOR THE PREPARATION OF CYANOTETRACHLOROBENZENES

**David J. Milner, Manchester, England, assignor to Imperial Chemical Industries PLC, London, England**

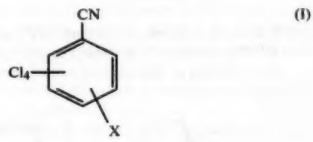
**Filed Feb. 1, 1984, Ser. No. 575,997**

**Claims priority, application United Kingdom, Feb. 15, 1983, 8304161**

**Int. Cl.**[3] **C07C** *121/50*

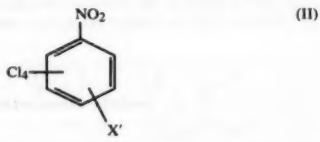
**U.S. Cl. 260—465 G** **7 Claims**

1. A process for the preparation of a compound of formula (I):



(I)

in which X is CN or, when X is in a position *meta* to the CN group in formula (I), CN or $NO_2$, which process comprises reacting in a liquid medium a compound of formula (II):



(II)

in which X', which is in a corresponding position to X, is CN or $NO_2$ with, in solution, an inorganic cyanide, whereby at least one $NO_2$ group is replaced by a cyano group.

## 4,517,130
## SUBSTITUTED AMINO ACID PROCESS

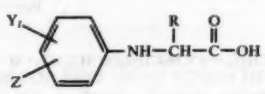
**Ted A. Baer, Palo Alto, Calif., assignor to Zoecon Corporation, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 370,720, Apr. 22, 1982, abandoned. This application Feb. 17, 1984, Ser. No. 581,385**

**Int. Cl.³ C07C** *121/78, 101/447*

**U.S. Cl. 260—465 E** **17 Claims**

6. A process for preparing a compound of formula (I):



(I)

wherein,

t is zero, one, two, three or four;

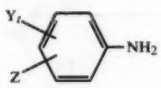
Y is independently selected from hydrogen, lower alkyl, lower haloalkyl, lower alkoxy, lower haloalkoxy, lower alkylthio, lower haloalkylthio, lower alkylcarbonyl, lower alkoxycarbonyl, and halogen;

Z is independently selected from the values of Y and cycloalkyl; or Y and Z together form a methylenedioxy group; and

R is lower alkyl, lower alkenyl, cycloalkyl or hydrogen;

which comprises:

(a) reacting an amine of formula (II):

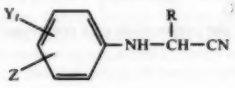


(II)

with at least one molar equivalent of hydrogen cyanide and at least one molar equivalent of an aldehyde of the formula

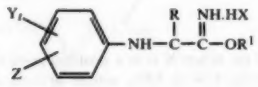
(III)

to form a nitrile of formula (IV):



(IV)

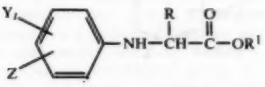
(b) reacting a nitrile of formula (IV) with a strong acid in $R^1OH$, wherein $R^1$ is methyl or ethyl, to yield a non-aqueous solution of the imidate salt of formula (V):



(V)

wherein X is the anion of a strong mineral acid,

(c) adding water to the non-aqueous solution of an imidate of formula (IV) to form an ester of formula (VI):



(VI)

and,

(d) reacting said ester with sodium hydroxide in methanol or ethanol and acidifying it to form an acid of formula (I).

## 4,517,131
## HIGH YIELD PROCESS FOR THE CYANOALKYLATION OR AMIDOALKYLATION OR HYDROXYAROMATIC COMPOUNDS

**Robert E. Hefner, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 11, 1981, Ser. No. 301,170**

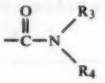
**Int. Cl.³ C07C** *121/75*

**U.S. Cl. 260—465 F** **11 Claims**

1. A process for amido-alkylating or cyano-alkylating hydroxyaromatic compounds, which comprises:

(a) in the presence of a catalyst and water, contacting a hydroxyaromatic compound with a haloamidohydrocarbylene or halocyanohydrocarbylene of the formula

wherein X is a halogen and $R_1$ and $R_2$ are independently hydrogen or $C_1$–$C_{10}$ alkyl; Y is —C≡N or



wherein $R_3$ and $R_4$ are independently H or $C_{1-10}$ alkyl; and

(b) adding an alkaline agent to the mixture under conditions sufficient to form the corresponding amido- or cyanoalkylated aromatic compound.

## 4,517,132
## PROCESS FOR PREPARATION OF CYANOHYDRINS

**John K. Chan, Raleigh, N.C., assignor to Union Carbide Corporation, Danbury, Conn.**

**Filed Jun. 29, 1983, Ser. No. 509,135**

**Int. Cl.³ C07C** *121/75, 121/36*

**U.S. Cl. 260—465 F** **8 Claims**

1. A method of preparing cyanohydrins which comprises:

(a) reacting a compound of Formula A

(A)

wherein $R_1$ and $R_2$ are individually hydrogen, alkyl, haloalkyl, alkoxyalkyl, aryl, alkylaryl, haloaryl or alkoxyaryl; with

(B) a metallic cyanide; and

(c) hydrochloric acid; in the presence of a solvent; and

(b) recovering the cyanohydrin.

## 4,517,133
## METHOD OF PREPARING SULFONYL ISOCYANATES

**Karl Reich, Carlsberg, Austria, assignor to Teroson GmbH, Heidelberg, Fed. Rep. of Germany**

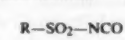
**Filed Sep. 20, 1983, Ser. No. 534,029**

**Claims priority, application Fed. Rep. of Germany, Sep. 22, 1982, 3235045**

**Int. Cl.³ C07C** *153/00*

**U.S. Cl. 260—545 R** **6 Claims**

1. A method of preparing sulfonyl isocyanates having the general formula



I.

wherein R is a linear or branched $C_1$- to $C_{18}$-alkyl radical, a phenyl radical, an alkyl phenyl radical having at least one linear or branched alkyl group containing from 1 to 18 C-atoms, or an isocyanate group, by reacting the corresponding sulfonylchlorides having the general formula

$$R—SO_2—CL \qquad II,$$

wherein R has the meaning as set forth above, with an isocyanate, characterized in that trimethyl silylisocyanate is used as the isocyanate and that the reaction is carried out in the presence of catalytic amounts of Lewis acids.

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## 4,517,134
## VARIABLE VENTURI CARBURETOR

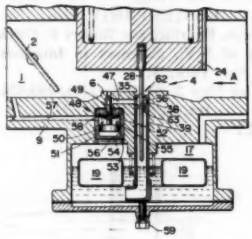
**Ken Nakamura, Kawasaki; Tadashi Nagai, Yokosuka; Giichi Shioyama, Yokosuka; Yutaka Matayoshi, Yokosuka; Eiichi Ohnishi, Yokosuka; Junichi Yokoyama, Ebina, and Atsushi Yonezawa, Yokosuka, all of Japan, assignors to Nissan Motor Company, Ltd., Japan**

**Filed Dec. 13, 1983, Ser. No. 560,973**

**Claims priority, application Japan, Dec. 27, 1982, 57-234714; Mar. 15, 1983, 58-37111[U]; Mar. 17, 1983, 58-38812[U]**

**Int. Cl.³ F02M 9/06**

**U.S. Cl. 261—39 A** **13 Claims**



1. A variable venturi carburetor comprising:

(a) a fixed venturi portion;

(b) a nozzle body having at least two nozzle portions arranged in series, said nozzle body being disposed in said fixed venturi portion;

(c) a suction piston serving as a movable venturi portion for forming a venturi between said fixed venturi portion and said movable venturi portion within an intake passage, said suction piston movable toward or away from said fixed venturi portion in response to the vacuum generated due to air passing through the venturi, the movement of said suction piston varying the cross-sectional area of the venturi;

(d) a tapered jet needle attached to the lower end of said suction piston so as to pass through the nozzle portions formed in said nozzle body, said at least two nozzle portions and said tapered jet needle defining at least two nozzle passages adapted to convey fuel from a source to said venturi;

(e) an auxiliary fuel passage, one end of which communicates with the intake passage at a downstream region of said venturi and the other end of which communicates with a space formed between two adjacent nozzle portions; and

(f) means for controlling the cross-sectional area of said auxiliary fuel passage according to engine operating conditions to supply, as required, a greater amount of fuel to the intake passage through at least one nozzle passage and said auxiliary fuel passage and a smaller amount of fuel to the intake passage through at least two nozzle passages.

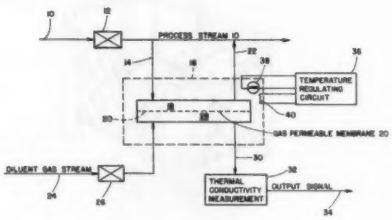
## 4,517,135
## CARBONATION MEASURING SYSTEM AND PROCESS

**Peter Szerenyi, Cross River, and Colin J. Ringleib, Shenorock, both of N.Y., assignors to PepsiCo, Inc., Purchase, N.Y.**

**Filed Jun. 21, 1983, Ser. No. 506,701**

**Int. Cl.³ B01F 3/04**

**U.S. Cl. 261—104** **17 Claims**




1. A process for continuously measuring the carbonation level of a carbonated and pressurized water based liquid beverage having carbon dioxide under pressure applied thereto, in a beverage carbonation process, from a continuous process stream, comprising the steps of:

a. continuously contacting a first side of a gas permeable element with the carbonated and pressurized liquid beverage from the continuous process stream such that carbon dioxide permeates through the element substantially in proportion to the extent of carbonation of the liquid beverage;

b. continuously contacting a second opposite side of said gas permeable element with a diluent gas stream such that carbon dioxide permeating through the element is picked up by the diluent gas stream;

c. continuously detecting the concentration of carbon dioxide in the diluent gas stream to provide a continuous measurement of the extent of carbonation of the liquid beverage in the continuous process stream; and

d. utilizing the result of said detecting step to control the carbonation of the beverage in the carbonation process to obtain a carbonated beverage having a suitable beverage carbonation level.

9. A system for continuously measuring the carbonation level of a carbonated and pressurized water based liquid beverage, having carbon dioxide applied thereto, in a beverage carbonation system, from a continuous process stream comprising:

a. an enclosure separated by a gas permeable element into first and second chambers;

b. means for continuously introducing the carbonated and pressurized liquid beverage from the continuous process stream into said first chamber adjacent to a first side of said gas permeable element;

c. means for continuously introducing a diluent gas stream into said second chamber adjacent to a second, opposite side of said gas permeable element, such that carbon dioxide permeating through the element is picked up by the diluent gas stream;

d. means for continuously detecting the concentration of carbon dioxide in the diluent gas stream to provide a continuous measurement of the extent of carbonation of the liquid beverage from the continuous process stream;

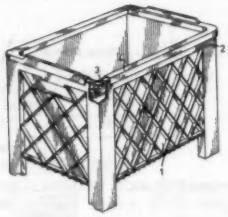
e. means, coupled to said detecting means, for controlling the carbonation of the beverage in the beverage carbonation system to obtain a carbonated beverage having a suitable beverage carbonation level.

**4,517,136**

## PREPARING REINFORCED IMPERVIOUS ARTICLES

**Andre Hemery, Les Andelys, France, assignor to Allibert S.A., France**

**Filed Aug. 26, 1982, Ser. No. 411,884**
**Claims priority, application France, Sep. 18, 1981, 81 17615**
**Int. Cl.³ B29C** *6/04*
**U.S. Cl. 264—25** **9 Claims**



1. A process for preparing an impervious article including a reinforcing frame member disposed between shock resistant, thermoplastic walls, comprising the steps of

disposing the reinforcing frame member between the shock resistant, thermoplastic walls,

after disposing the reinforcing frame member between the shock resistant, thermoplastic walls, heating the walls of shock resistant, thermoplastic disposed on either side of the reinforcing frame member, the walls defining a channel in which the reinforcing frame member is situated, the channel open on one side thereof, said heating carried out along an area of the walls on outer sides thereof opposite sides defining the channel and over an area proximate to the open part of the channel, to at least the softening point of the shock resistant, thermoplastic in the areas of the walls, over a depth between about ¼–¾ of the respective thicknesses of the walls,

after softening of the areas of the walls, and while the walls are in softened condition, injecting under pressure onto the outer sides of these walls and over the open part of the channel, a compatible plastic material substantially resistant to cracking under stress, and

allowing the injected plastic material and the heated areas of the walls to cool, whereby the injected plastic material becomes heat welded to the walls to form a capping material over the reinforcing frame member substantially resistant to cracking under stress.

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**4,517,137**

## METHOD AND APPARATUS FOR IMPREGNATING POROUS ELECTRODES OR THE LIKE

**Christian O. Schön, Römerstrasse 1, D-7590 Achern 18, Fed. Rep. of Germany**

**Continuation of Ser. No. 323,884, Nov. 23, 1981, abandoned. This application Nov. 30, 1983, Ser. No. 557,403**
**Claims priority, application Fed. Rep. of Germany, Dec. 6, 1980, 3046171**
**Int. Cl.³ C01B** *31/00*
**U.S. Cl. 264—29.5** **41 Claims**

1. A method of impregnating porous solid bodies comprising the steps of:

(a) introducing a porous solid body into a sealable mobile vessel;

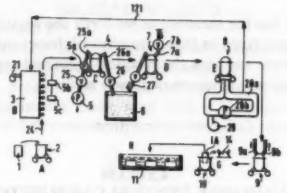
(b) heating the body at a heating station while the body is in the vessel;

(c) transporting the vessel with the heated body therein to a contacting station;

(d) contacting the body in the vessel with a flowable filler material at said contacting station for impregnation of the body;

(e) sealing the interior of the vessel from the atmosphere subsequent to said introducing step and prior to said contacting step, said contacting step including establishing communication between the interior of the vessel and a source of the flowable filler material while maintaining the vessel otherwise sealed;

(f) transporting the sealed vessel with the body therein from said contacting station to a cooling station;



(g) cooling the body in the vessel with a cooling medium at said cooling station, said cooling step including establishing communication between the interior of the vessel and a cooling system while maintaining the vessel otherwise sealed; and

(h) removing the body from the vessel subsequent to said cooling step.

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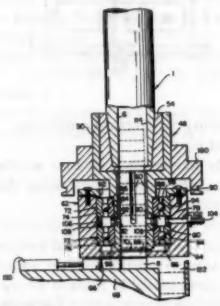
**4,517,138**

## DEVICE AND METHOD FOR CENTRIFUGALLY CASTING ARTICLES

**David L. Rawlings, Bayville, and Robert E. Glick, Huntington Station, both of N.Y., assignors to International Hydron Corporation, New York, N.Y.**

**Filed May 2, 1983, Ser. No. 490,634**
**Int. Cl.³ B29D** *11/00*
**U.S. Cl. 264—2.1** **20 Claims**



13. A method for the centrifugal casting of shaped plastic contact lenses which comprises the steps of:

(a) rotating a polymerization column about its longitudinal axis to provide an elongated zone at least a portion of which comprises an elongated tubular polymerization zone, said polymerization column adapted to receive and accommodate a plurality of vertically arranged molds in interference fitting relationship;

(b) force feeding into one end of said polymerization column a series of said molds, one at a time, each containing a lens forming material of a fluid polymerizable or curable material in the cavity of the mold, such that each of said molds is secured in an interference fitting relationship within said polymerization column whereupon the rotation of said polymerization column about its longitudinal axis causes the synchronized rotation of said molds while maintaining concentricity of said molds with the longitudinal axis of said polymerization column;

(c) rotating said polymerization column about its longitudinal axis at a speed sufficient to cause radially outward displacement of said polymerizable or curable material in the cavity of the molds within the elongated zone to assume a predetermined configuration;

(d) maintaining the elongated polymerization zone under polymerizable conditions to convert said polymerizable or curable material of predetermined configuration into the predetermined shaped solid contact lenses; and

(e) withdrawing each of said molds from said polymerization column after at least the polymerizable or curable material therein is formed into the predetermined shaped solid contact lenses.

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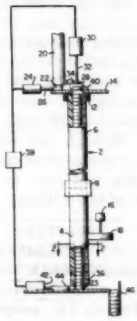
**4,517,139**

## DEVICE AND METHOD FOR CENTRIFUGALLY CASTING ARTICLES ON A CONTINUOUS BASIS

**David L. Rawlings, Bayville, and Robert E. Glick, Centerport, both of N.Y., assignors to International Hydron Corporation, New York, N.Y.**

**Filed May 2, 1983, Ser. No. 490,642**
**Int. Cl.³ B29D *11/00***
**U.S. Cl. 264—2.1** **10 Claims**



7. A method for centrifugally casting of shaped contact lenses on a continuous basis comprising the steps:

(a) rotating a polymerization column about its longitudinal axis to provide an elongated polymerization zone, said polymerization column being adapted for receiving a plurality of molds in vertical series, and restraining means associated with said polymerization column and said molds for maintaining said plurality of molds within said polymerization column;

(b) intermittently force feeding a series of said molds one at a time into the inlet end of said polymerization column, said molds containing a polymerizable or curable composition and each of said forced fed molds causing a displacement of the series of said molds with said polymerization column by an amount sufficient to eject the bottommost mold out the outlet end of said polymerization column and the time interval between the advancing and force feeding cycle of successive molds being sufficient so that the rotation of said polymerization column causes and/or maintains the radially outward displacement of said polymerization or curable composition in the cavity of each of said molds within said polymerization zone to assume a predetermine liquid configuration and being sufficient so that said bottom most mold being ejected out the outlet end of said polymerization column has its polymerizable or curable composition at least substantially formed into a predetermined shaped contact lenses; and

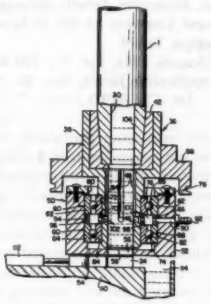
(c) collecting said intermittent ejected molds containing the predetermined shaped contact lenses.

**4,517,140**

## DEVICE AND METHOD FOR CENTRIFUGALLY CASTING ARTICLES

**David L. Rawlings, Bayville, N.Y., assignor to International Hydron Corporation, New York, N.Y.**

**Filed May 2, 1983, Ser. No. 490,598**
**Int. Cl.³ B29D *11/00***
**U.S. Cl. 264—2.1** **11 Claims**



9. A method for centrifugally casting of shaped contact lenses comprising the steps:

(a) providing an elongated tubular polymerization zone within a polymerization column, said column being adapted for receiving a plurality of gravity fed, free falling molds, and said polymerization column and said molds having cooperative mating means for aligning said molds within said polymerization column;

(b) gravity feeding into one end of said polymerization column a series of said molds each containing a polymerizable or curable composition;

(c) rotating said polymerization column such that the cooperative mating means associated with said polymerization column and said molds maintains the rotation of said molds in synchronization with the same speed of rotation of said polymerization column, said rotation speed being sufficient to cause the polymerizable or curable composition to flow radially outward by centrifugal force in the cavity of each of said molds thereby said composition assuming a predetermined shaped contact lenses; and

(d) stopping the rotation of the polymerization column and withdrawing said gravity fed molds from the opposite end of said polymerization column after at least said polymerizable or curable composition is formed into a predetermined shaped contact lenses in said polymerization zone.

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**4,517,141**

## PRODUCTION OF MICROCAPSULES HAVING WALLS OF POLYADDITION PRODUCTS OF WATER-INSOLUBLE POLYAMINES WITH WATER-SOLUBLE POLYISOCYANATE ADDUCTS

**Manfred Dahm; Norbert Weimann; Ulrich Nehen, all of Leverkusen; Hanns P. Müller, Odenthal-Blecher; Gert Jabs; Albert Awater, both of Odenthal, and James M. Barnes, Wermelskirchen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Jun. 21, 1983, Ser. No. 506,451**
**Claims priority, application Fed. Rep. of Germany, Jun. 30, 1982, 3224454; Jun. 30, 1982, 3224456**
**Int. Cl.³ B01J *13/02***
**U.S. Cl. 264—4.7** **4 Claims**

1. A process for the production of a microcapsule having a hydrophobic core material and a capsule wall formed from the reaction of a polyisocyanate adduct and a polyamine, said process comprising emulsifying in water or in an aqueous protective colloid solution a mixture of a hydrophobic core

material and a water-insoluble polyamine, adding a water-soluble polyisocyanate bisulphite adduct in the form of powder or an aqueous solution and allowing the mixture to react to completion at a temperature of from 1° to 140° C.

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**4,517,142**

## METHOD FOR PRODUCING PERMEABLE POLYMERIC MEMBRANES

**Avraham M. Baniel, Jerusalem, Israel, assignor to Yissum Research Development Company of the Hebrew University of Jerusalem, Jerusalem, Israel**

**Filed Aug. 6, 1981, Ser. No. 290,604**
**Claims priority, application Israel, Aug. 20, 1980, 60886**
**Int. Cl.³ B29D** *27/00*
**U.S. Cl. 264—22** **14 Claims**

1. In a method for producing permeable polymeric membranes by removal of substances contained in a polymeric mass resulting in the formation of pores, the improvement comprising providing a single phase thermoplastic polymeric mass consisting essentially of a polymeric backbone and having either (a) pendant groups having decomposable molecular units chemically bound to said polymeric backbone or (b) compounds having decomposable molecular units molecularly dispersed in said polymeric mass and inducing the decomposition of said molecular units into smaller, discrete molecular units which spontaneously leave the polymeric mass by diffusion without melting of the polymer mass and/or decomposition of said polymeric backbone.

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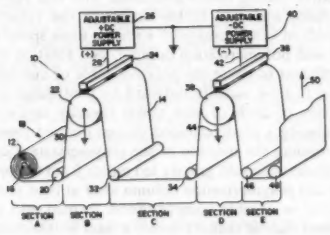
**4,517,143**

## METHOD AND APPARATUS FOR UNIFORMLY CHARGING A MOVING WEB

**Semyon Kisler, West Newton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Oct. 3, 1983, Ser. No. 538,221**
**Int. Cl.³ H05F** *3/00*
**U.S. Cl. 264—22** **17 Claims**




1. Apparatus for establishing a uniform electrostatic charge level on a web of material having random bounded-type electrostatic charges thereon, comprising:

means for generating a first electrostatic field of predetermined intensity and polarity at a particular spatial location;

means for establishing a second electrostatic field of different intensity and of opposite polarity with respect to said first electrostatic field at a different spatial location; and

means for initially moving said randomly charged web through said first electrostatic field for the purposes of changing the polarity of either the

positive or the negative random bounded-type electrostatic web charges and subsequently moving said web from said first electrostatic field and through said second electrostatic field to change the polarity of the electrostatic charge on said web after exposure to said first electrostatic field and to thereby produce a uniform electrostatic charge level on said moving web.

9. A method of establishing a uniform charge level on a randomly charged web having bounded-type electrostatic charges thereon, comprising the steps of:

establishing a first electrostatic field of predetermined polarity and intensity at a particular spatial location;

establishing a second electrostatic field of different intensity and of opposite polarity with respect to said first electrostatic field at a different spatial location; and

moving said randomly charged web through said first electrostatic field for the purpose of changing the polarity of either the positive or the negative random elecrostatic web charges and subsequently moving said web from said first electrostatic field and through said second electrostatic field to change the polarity of the electrostatic charge on said web after exposure to said first electrostatic field and to thereby produce a uniform electrostatic charge level on said moving web.

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**4,517,144**

## METHOD FOR CUTTING AND SEPARATING GREEN CERAMIC CAPACITOR BODIES

**Gary D. Harland, and Dean B. Brownell, both of Wichita Falls, Tex., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Nov. 21, 1983, Ser. No. 553,613**
**Int. Cl.³ B28B** *11/00*
**U.S. Cl. 264—28** **10 Claims**

1. A method for cutting and separating green ceramic capacitor bodies containing buried electrodes comprising forming a green ceramic cake containing said buried electrodes on a porous substrate; cutting said cake by pressing a long sharp blade into and substantially through said cake to establish a cutting plane there through and with drawing said blade; chilling said cake to a temperature colder than −100° C.; and mechanically stressing said cake to break said green cake cleanly at said plane of said cutting.

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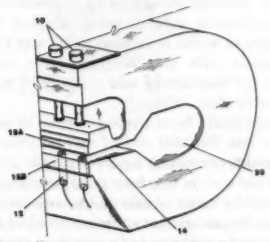
**4,517,145**

## EXTRUSION DIE AND PROCESS FOR THICKNESS CONTROL

**William H. Knopf, Taylors, S.C., assignor to American Hoechst Corporation, Somerville, N.J.**

**Filed Nov. 7, 1983, Ser. No. 549,097**
**Int. Cl.³ B29D** *7/22*
**U.S. Cl. 264—40.2** **14 Claims**



1. An improved adjustable extrusion die comprising

(a) a plurality of inner flow surfaces in opposed relationship to each other, thereby defining a die gap,

(b) means for adjustment of the relationship of said inner flow surfaces to each other whereby said die gap may be expanded or contracted,

(c) at least one proximity sensor, selected from the group consisting of capacitance-effect and optical fiber sensors, mounted within and flush with at least one of said inner flow surfaces, said sensor possessing a working surface substantially as smooth as said inner flow surface, such that the actual die gap can be directly measured by said

proximity sensor during operation of said adjustable extrusion die.

14. A method of sheet thickness control comprising

(i) extruding a plastic melt through a sheet-forming die comprising

(a) a plurality of inner flow surfaces in opposed relationship to each other, thereby defining a die gap

(b) means for adjustment of the relationship of said inner flow surfaces to each other whereby said die gap may be expanded or contracted,

(c) at least one proximity sensor, selected from the group consisting of capacitance-effect and optical fiber sensors, mounted within and flush with at least one of said inner flow surfaces, said sensor prossessing a working surface substantially as smooth as said inner flow surface, such that the actual die gap can be measured by said proximity sensor during operation of said adjustable extrusion die,

thereby forming a sheet of plastic;

(ii) directly measuring the actual die gap while said plastic melt is flowing through said die

(iii) measuring the thickness of the sheet of plastic with thickness measuring means

(iv) correcting any deviation in

(a) the measured die gap or

(b) the measured thickness of the sheet of plastic by appropriate adjustment of said means for adjustment of the relationship of said inner flow surface to each other.

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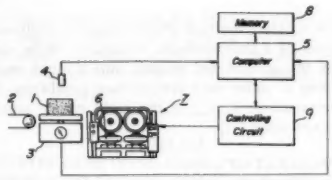
**4,517,146**

## METHOD FOR CONTROLLING TIRE VULCANIZATION

**Ryo Takasu, Kodaira, and Makoto Nakao, Higashimurayama, both of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan**

**Filed Sep. 30, 1983, Ser. No. 537,607**
**Claims priority, application Japan, Oct. 1, 1982, 57-172697**
**Int. Cl.³ B29H 5/02**
**U.S. Cl. 264—40.6** **6 Claims**




1. A method for controlling a tire vulcanization of a vulcanizing apparatus comprising the steps of:

measuring an initial temperature of a green tire before vulcanization;

estimating tire temperatures during vulcanization without actually measuring the temperature of the tire during vulcanization, said tire temperatures being successively calculated from the initial tire temperature in accordance with a first order approximation;

calculating a sum of products of vulcanizing rates derived from said estimated tire temperature during vulcanization; and

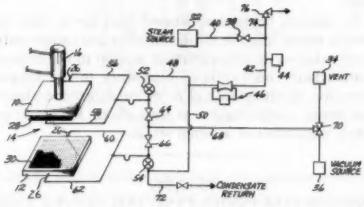
stopping said tire vulcanization when said sum of products of vulcanizing rates becomes equal to a predetermined value.

**4,517,147**

## PRESSING PROCESS FOR COMPOSITE WOOD PANELS

**Michael N. Taylor, and Timothy H. Reid, both of Tacoma, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.**

**Continuation-in-part of Ser. No. 576,786, Feb. 3, 1984, abandoned, which is a continuation of Ser. No. 435,140, Oct. 18, 1982, abandoned. This application Apr. 13, 1984, Ser. No. 599,599**
**Int. Cl.³ B29J 5/02**
**U.S. Cl. 264—83** **13 Claims**




1. A method of forming a panel or the like from a mat of lignocellulosic material and a curable binder, comprising the steps of:

compressing the mat between a pair of heated press platens to a first density within an intermediate-density range which is less than a final density and to a thickness within an intermediate thickness range which is greater than the final thickness,

injecting steam into both major surfaces of the mat while the mat is within the intermediate density and thickness ranges for a period of time sufficient to substantially saturate the mat with steam while allowing excess steam to exhaust through the edges of the partially compressed mat,

passing steam substantially through the mat from one major surface to the other while the mat is still within the intermediate density and thickness ranges to assure complete saturation,

compressing the mat to a higher density and a lower thickness to consolidate the mat and cure the binder, and

opening the platens after curing the binder and removing the so formed panel.

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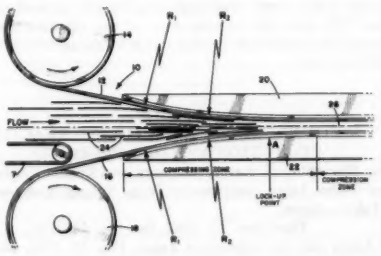
**4,517,148**

## METHOD FOR PRESSING A COMPOSITE ASSEMBLY

**Mark T. Churchland, Vancouver, Canada, assignor to MacMillan Bloedel Limited, Vancouver, Canada**

**Filed Nov. 1, 1983, Ser. No. 547,574**
**Int. Cl.³ D04H 1/16**
**U.S. Cl. 264—112** **14 Claims**




1. In a continuous process of forming an extended elongate product from a plurality of elongate strands by subjecting the strands to heat and pressure wherein the improvement com-

prises a method of compressing the strands in a manner to reduce internal stresses imparted to the product during compressing, including the steps of:

(a) transporting a mat containing generally parallel strands in a generally random overlapping relationship through a compressing zone of a press assembly; and

(b) increasing the pressure on the strands as they pass from an inlet end to an outlet end of the compressing zone by gradually converging facing walls of the press assembly so that:

(i) the strands being compressed move relative to one another through at least a portion of the compressing zone, and

(ii) the strands being compressed lock-up so that they no longer move relative to one another but rather only compress relative to one another at a point in the compressing zone where the radius of curvature in the longitudinal direction on either side of a central reference plane of the mat being compressed is at least about 30 feet to provide a low remembered internal stress.

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**4,517,149**

## PROCESS FOR PRODUCING POLYESTER FIBER

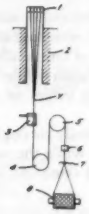
**Ken-ichiro Oka; Masatoshi Mineo, both of Mishima, and Terumichi Ono, Tokyo, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Division of Ser. No. 276,058, Jun. 22, 1981, Pat. No. 4,390,685. This application Dec. 2, 1982, Ser. No. 446,352**

**Claims priority, application Japan, Jun. 27, 1980, 55-86575; Jun. 27, 1980, 55-86576**

**Int. Cl.³ D02G *3/00*; B29F *3/08***

**U.S. Cl. 264—210.8** **5 Claims**



1. A process for producing a polyester fiber from a thermoplastic polyester feed stock having a moisture regain not less than 0.005% comprising maintaining the thermoplastic polyester at melt spinning temperature for more than 15 minutes prior to spinning, melt spinning the thermoplastic polyester at a spinning temperature not lower than 300° C. through a spinneret into a filament and taking up the filament after solidifying the spun filamentary polymer, characterized in that the thermoplastic polyester feed stock has an inherent viscosity of not higher than 0.63, the whole process from spinning through take-up is carried out without heating the filament, the filament is subject to stretch treatment at a stretch ratio of not more than 20% after the solidification of the filament but before take-up, and take-up is carried out at a take-up of not less than 5,000 m/min.

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**4,517,150**

## METHOD FOR MANUFACTURING REACTIVE INJECTION-MOLDED PRODUCTS

**Asao Harashima; Takashi Nakamura, and Keiichi Kishimoto, all of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan**

**Filed Dec. 23, 1983, Ser. No. 565,079**

**Claims priority, application Japan, Feb. 17, 1983, 58-25309**

**Int. Cl.³ B29C *1/04*; B29F *1/00*; B29D *27/00*; C08K *5/54***

**U.S. Cl. 264—300** **20 Claims**

1. In a process of reaction injection molding of polyurethanes which includes the mixing of one or more of each of polyols, polyisocyanates and catalysts, the reaction of the foregoing ingredients, and the molding and curing of the foregoing mixture into the desired configuration, the improvement comprising mixing with the other ingredients an organopolysiloxane which contains per molecule at least one —COOA group bonded to a silicon atom through a carbon to silicon bond, wherein A is an alkali metal.

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**4,517,151**

## METHOD FOR MOLDING HOLLOW BLOW-MOLDED ARTICLES

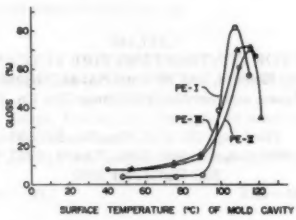
**Kazuhiro Masumoto, Ohtake; Mituaki Fujimura, Iwakuni, and Masauki Sawazaki, Iwata, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo and Yazaki Plastics Industries Co., Ltd., Shizuoka, both of, Japan**

**Filed Dec. 1, 1982, Ser. No. 445,972**

**Claims priority, application Japan, Dec. 4, 1981, 56-195452; Mar. 15, 1982, 57-41138**

**Int. Cl.³ B29C *17/07***

**U.S. Cl. 264—540** **2 Claims**




1. A blow molding method which comprises melt-extruding a hot parison of a thermoplastic crystalline olefin resin and introducing the as-extruded parison into a mold cavity and blow molding it under such temperature conditions that the surface temperature, T° C., of the mold cavity satisfies the following expression (1),

$$T_c - T_1 - \Delta T < T < T_c + T_2 \quad (1)$$

wherein

$T_c$ is the DSC crystallizing temperature in °C. of the olefin resin,

$T_1$ is 20° C. when the olefin resin is a $C_2$ olefin and 30° C. when it is another olefin resin,

$T_2$ is 10° C., and

$\Delta T$ is a corrected value in °C. which is represented by the following equation (2) and holds good only when a mold having a heat insulating layer on the surface of its cavity is used,

$$\Delta T = (-12.7 \log_{10}\lambda - 15.2 + 25t) \quad (2)$$

wherein $\lambda$ is the heat conductivity of the heat insulating layer in cal/cm·sec·°C., and t is the thickness in cm of the heat-insulating layer.

## 4,517,152
## METHOD OF TESTING FUEL ELEMENT TUBES FOR DEFECTS

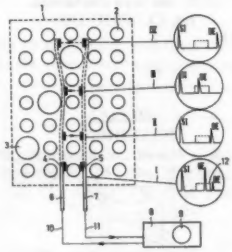
**Kurt Pieper, Troisdorf, and Rainer Scharpenberg, Waldmichelbach, both of Fed. Rep. of Germany, assignors to Krautkramer GmbH, Cologne and Brown Boveri Reaktor GmbH, Mannheim, both of, Fed. Rep. of Germany**

**Filed Nov. 4, 1982, Ser. No. 439,039**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1981, 3149362**

**Int. Cl.³ G21C** *17/06*

**U.S. Cl. 376—252** **1 Claim**



1. The method of testing spaced fuel element tubes which are assembled in bundles to form a reactor core by ultrasonic energy, wherein an ultrasonic transmit transducer and an ultrasonic receive transducer are moved through open spaces between the tubes and when testing a tube are disposed with a tube in the space between said transducers, said transmit transducer when in position for testing a tube being energized to cause ultrasonic energy to propagate in said tubing and the resulting revolving echo signal being received by said receive transducer and if occurring within a predetermined gated time interval **(12)** being passed to an evaluation means, the improvement comprising:

determining anew for each tube to be tested the start of said gated time interval **(12)** by measuring the transit time value ($T_L$) of ultrasonic signals traversing the distance from said transmit transducer **(4)** to said receive transducer **(5)** when said transducers are in the open space between the last tested tube and the next to be tested tube, and

subtracting a constant value (C) from the transit time value ($T_L$), said constant value (C) being selected to cause the transmitted ultrasonic signal (DE) received during the transit time measurement to fall just outside said gated time interval **(12)**.

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## 4,517,153
## DEVICE FOR REMOVING COOLING FLUID, MAKING IT POSSIBLE TO LOCATE DEFECTIVE ARRAYS IN A NUCLEAR REACTOR IN OPERATION

**Alain Plaziaud, Sevres, France, assignor to Novatome, Le Plessis Robinson, France**

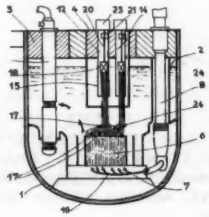
**Filed Mar. 29, 1982, Ser. No. 362,821**

**Claims priority, application France, Apr. 30, 1981, 81 08634**

**Int. Cl.³ G21C** *17/04*

**U.S. Cl. 376—253** **4 Claims**

1. In a fast neutron nuclear reactor comprising a core consisting of fuel assemblies arranged side by side with their lateral faces in contact in va vessel containing a reactor cooling fluid circulated by means of pumping, so as to traverse the core in the longitudinal direction of said assemblies, and a device incorporating means for detecting and localizing defective assemblies by detecting fission products in the cooling fluid, consisting of at least one localizing module and sampling conduits for abstracting the cooling fluid, each being associated with a fuel assembly, independently joining each of the zones situated at the exit of each of said assemblies to the localizing module and assuring the transport of said cooling fluid from the core exit as far as said modules, the improvement consisting of at least two completely independent localizing modules and an arrangement of the sampling conduits joining the exit of said



assemblies to said modules such that, for each assembly of said core, there is at least one adjacent assembly in contact through the intermediary of one of its lateral faces, which is connected by its sampling conduit to a localizing module different from the module to which the first assembly is connected by its sampling conduit.

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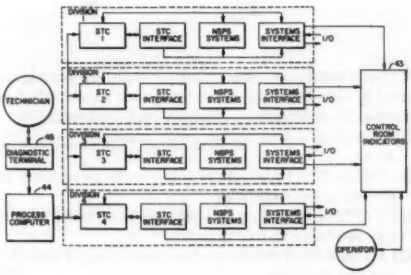
## 4,517,154
## SELF-TEST SUBSYSTEM FOR NUCLEAR REACTOR PROTECTION SYSTEM

**Ulric E. Dennis; Dennis W. Hollenbeck; John A. Kirtland; Kenneth B. Stackhouse; Patricia A. Wilson; William D. Hill, all of San Jose; David D. Akers, Los Gatos, and Elmer D. Hill, Sacramento, all of Calif., assignors to General Electric Company, San Jose, Calif.**

**Filed Jul. 27, 1982, Ser. No. 402,053**

**Int. Cl.³ G21C** *17/00*

**U.S. Cl. 376—259** **29 Claims**




1. A self-test system for a nuclear reactor protection system (RPS), comprising:

a processor for generating a series of RPS test pattens and test vectors, said processor including a series of related expected test results;

a plurality of self-test elements coupled to said processor for receiving said test vectors and adapted to receive and store related actual test results from the RPS;

first means responsive to commands from said processor for selecting from said self-test elements those self-test elements corresponding to said RPS test patterns;

second means responsive to commands from said processor for generating a short duration test pulse which is transmitted along the actual RPS operating path without causing an RPS response, and adapted to effect injection of said test vectors into the RPS by said self-test elements;

means coupled to said self-test elements for monitoring said actual test results and coupled to said processor for com-

paring said actual test results with said expected test results; and

means coupled to said monitoring and comparing means and for indicating differences between said actual test results and said expected test results.

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**4,517,155**

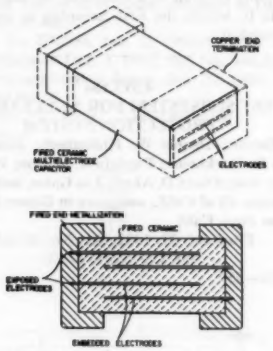
## COPPER BASE METAL TERMINATION FOR MULTILAYER CERAMIC CAPACITORS

**Sri Prakash, Simpsonville, and William B. Snyder, Jr., Greenville, both of S.C., assignors to Union Carbide Corporation, Danbury, Conn.**

**Continuation of Ser. No. 379,503, May 18, 1982, abandoned. This application May 3, 1984, Ser. No. 606,608**

**Int. Cl.³ B22F 7/00**

**U.S. Cl. 419—19** **5 Claims**




1. A method for providing a copper metallization end termination on a fired ceramic capacitor having a dielectric formed of barium or neodymium titanates which comprises

(i) providing a termination paste consisting essentially of about

(a) 75% to 97% by weight of solids in the paste being finely divided copper particles

(b) 3 to 25% by weight of solids the paste being cadmium-free and bismuth-free glass frit

(c) a volatile and decomposable organic liquid vehicle suspending the solids

(ii) applying the copper containing paste to an electrode exposed end portion of a matured ceramic multielectrode capacitor body having a dielectric formed of barium or neodymium titanates

(iii) heating the copper containing paste-covered end portion of the ceramic capacitor body to a temperature in the range of about 300° to 800° C. in a gaseous environment containing a small amount of oxygen which is in excess of 20 ppm and sufficient to prevent chemical reduction of ceramic during said heating but insufficient to oxidize said copper, the heating initially being at a lower temperature in said range for a period of time sufficient to remove substantially all organic binder and solvent constituents from the applied paste and thereafter being at a higher temperature in said range for a period of time sufficient to sinter the copper constituent of said applied paste and melt the glass constituent of said applied paste and bond the same said ceramic capacitor body.

**4,517,156**

## ELECTRICAL RESISTANT ALLOYS HAVING A SMALL TEMPERATURE DEPENDENCE OF ELECTRIC RESISTANCE OVER A WIDE TEMPERATURE RANGE AND A METHOD OF PRODUCING THE SAME

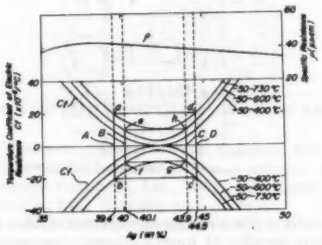
**Hakaru Masumoto, and Naoji Nakamura, both of Sendai, Japan, assignors to The Foundation: The Research Institute of Electric and Magnetic Alloys, Sendai, Japan**

**Continuation of Ser. No. 397,226, Jul. 12, 1982, Pat. No. 4,468,570, which is a division of Ser. No. 151,712, May 20, 1980, Pat. No. 4,374,679. This application Mar. 13, 1984, Ser. No. 589,213**

**The portion of the term of this patent subsequent to Feb. 22, 2000, has been disclaimed.**

**Int. Cl.³ C22C 5/00**

**U.S. Cl. 420—463** **2 Claims**




1. A shaped article having a temperature coefficient of electric resistance of $\pm 10 \times 10^{-6}$/°C. over a temperature range of −50° C. to +600° C., and comprising an electrical resistant alloy consisting essentially of 56.1 to 59.9 wt% of palladium and 43.9 to 40.1 wt% of silver and produced by shaping said electrical resistant alloy into a desired shape of wire on thin sheet by hot working and cold working, heating the shaped article at a recrystallization temperature of 500° to 1,000° C. in air or a non-oxidizing atmosphere or in vacuo for a time of not less than 2 seconds to not more than 100 hours, and slow cooling said shaped article to remove internal stress.

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**4,517,157**

## COPPER BASED BRAZING ALLOY

**Brian C. Coad, San Francisco, Calif., assignor to GTE Products Corporation, Stamford, Conn.**

**Filed Oct. 11, 1984, Ser. No. 659,811**

**Int. Cl.³ C22C 9/10**

**U.S. Cl. 420—490** **3 Claims**

1. A brazing alloy having a composition consisting essentially of from about 1 to about 3% by weight boron, from about 8% to about 12% by weight silicon, and the balance copper.

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**4,517,158**

## ALLOY WITH CONSTANT MODULUS OF ELASTICITY

**Masami Miyauchi, Yokohama, and Masayuki Itoh, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Feb. 9, 1984, Ser. No. 578,702**

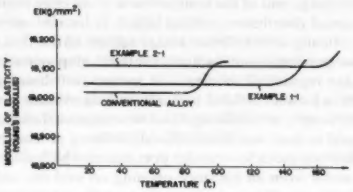
**Claims priority, application Japan, Mar. 31, 1983, 58-53555; Mar. 31, 1983, 58-53570**

**Int. Cl.³ C22C 30/00**

**U.S. Cl. 420—584** **8 Claims**

1. An alloy with constant modulus of elasticity consisting

essentially of from 40 to 44.5% by wt of nickel, from 4 to 6.5% by wt of chromium, from 0.5 to 1.9% by wt of titanium, from




0.1 to 1% by wt of aluminium, and from 0.2 to 2% by wt of zirconium, with the remainder being comprised of iron.

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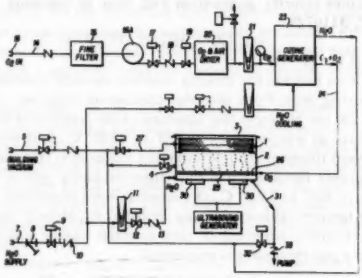
**4,517,159**
**STERILIZER**
**Eskil L. Karlson, 4634 State St., Erie, Pa. 16509**
**Filed Jul. 5, 1983, Ser. No. 510,552**
**Int. Cl.³ A61L** *2/00, 2/02, 2/20*
**U.S. Cl. 422—20** **13 Claims**




1. The method of sterilizing in which an article to be sterilized is submerged in water, and ozone from a separate ozone rich source is bubbled through the water and over said article while it is submerged thereby providing ozone concentration in excess of water saturation alone and releasing ozone from the water in the form of ozone filled bubbles which break in contact with said article and have a scrubbing action tending to dislodge surface contamination.

13. The method of sterilizing in which an article to be sterilized is submerged in water, and ozone from a separate ozone rich source is bubbled through the water and over the article while it is submerged, thereby providing ozone concentration in excess of water saturation alone and the submerged article is concurrently subjected to short bursts of ultrasonic vibration with dwell periods between bursts longer than the burst periods.

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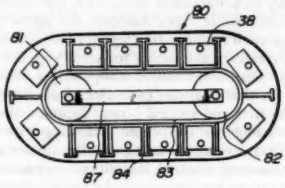
**4,517,160**
**AUTOMATIC ANALYZING APPARATUS**
**Kevin Galle, New City, N.Y.; Ryoichi Orimo, Ohme, Japan; Masahiko Sakurada, Machida, Japan; Taiichi Banno, Hachioji, Japan, and Sugio Manabe, Kodaira, Japan, assignors to Olympus Optical Company Limited, Japan**
**Division of Ser. No. 139,469, Apr. 11, 1980, abandoned. This application Jan. 25, 1983, Ser. No. 460,915**
**Claims priority, application Japan, Apr. 14, 1979, 54-44912**
**Int. Cl.³ G01N** *35/04*
**U.S. Cl. 422—65** **4 Claims**

1. An apparatus for delivering a certain amount of a given reagent selected from a plurality of reagents comprising:

cassette-like means holding a plurality of reagent bottles each containing more respective reagent of said plurality of reagents, said cassette-like means having a base member and upstanding vertical walls with a plurality of reagent containing bottles therein, said base member defining a path along which the bottles are conveyed;

means for detachably supporting said cassette-like means;




means for reciprocally moving the reagent bottles settled in the cassette-like in clockwise and counterclockwise rotation along said given path in order to index a desired reagent bottle to a reagent aspiration position;

means for aspirating into a probe a given amount of a selected reagent contained in the reagent bottle which is situated at the aspiration position and discharging the aspirated reagent into a reaction vessel.

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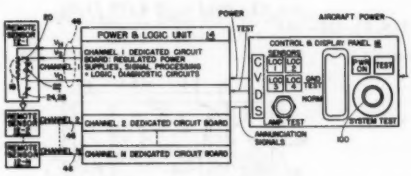
**4,517,161**
**COMBUSTIBLE VAPOR DETECTION SYSTEM**
**Anthony N. Gravina, Deer Park; Murray Keitel, Kings Park; Harvey Weiss, Port Jefferson; Joseph N. Wiley, Dix Hills, and Edmund G. Charland, Jr., Selden, all of N.Y., assignors to Grumman Aerospace Corp., Bethpage, N.Y.**
**Filed Sep. 29, 1982, Ser. No. 426,608**
**Int. Cl.³ G01N** *27/16;* **G08B** *21/00*
**U.S. Cl. 422—95** **10 Claims**




1. A combustible vapor detection system for an aircraft for detecting and annunciating the pressure and location of combustible vapors at a plurality of locations on the aircraft, comprising:

a. a plurality of combustible vapor detectors, each adapted to be placed at a location to be monitored on an aircraft at which combustible vapors may be present, each combustible vapor detector having a resistance which varies in dependence upon the concentration of a combustible vapor to be detected, such that it produces an electrical output signal which varies in dependence upon the concentration of the combustible vapor, each vapor detector comprising a semiconductor gas detecting element wherein adsorption of select types of gases on its surface decreases its resistance, and having a greater element for thermally activating surface reactions on the semi-conductor element, and each vapor detector having a temperature compensation circuit, including a thermistor, for providing thermally stable operation for the vapor detector;

b. a central control means, which receives the plurality of electrical output signals, comprising: (1) means for comparing each electrical signal with a separate threshold

value for each vapor detector, such that individual characteristics of each vapor detector are considered in setting its threshold value, and the threshold value for each vapor detector being set at a level corresponding to a fraction of the concentration of combustible vapors in air which will just support combustion; (2) means for generating an annunciation signal when at least one of the electrical output signals surpasses its threshold value; (3) and a plurality of annunciator indicators, one corresponding to each combustible vapor detector, for signaling the occurrence of each annunciation signal to an operator; and (4) a separate electrical channel for each vapor detector, each separate electrical channel comprising a dedicated circuit board for that channel, each electrical channel including separate first and second power supplies, the first power supply being for the vapor detecting element and the second power supply being for the heater element, and each electrical channel including a separate signal processing circuit for comparing the electrical signal from the vapor detector for that channel with a threshold value for that channel, each said dedicated circuit board comprising annunicator lights thereon for indicating proper operation of the components of that electrical channel, said annunciator lights including five LEDs, first and second LEDs for indicating operation of the first and second power supplies, a third LEd for indicating operation of the semiconductor vapor detecting element, a fourth LED for indicating operation of the temperature compensation circuit, and a fifth LED for indicating operation of the heater element; and

c. diagnostic means for testing the combustible vapor detectors for operation, and for indicating a malfunction thereof to the operator.

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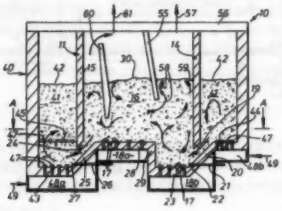
## 4,517,162
## APPARATUS FOR USE IN PROCESSING A SUBSTANCE IN A FLUIDIZED BED

**Gerald Moss, Wantage, England, assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Jun. 3, 1982, Ser. No. 384,472**
**Int. Cl.³ B01J *8/18;* F27B *15/00***
**U.S. Cl. 422—142** **13 Claims**



1. Apparatus comprising a fixed vessel, wherein the vessel comprises:

(a) outer walls;

(b) inner wall means which define at least two compartments within the vessel, wherein said inner wall means comprises at least one dividing wall, each said dividing wall extending inwardly from an outer wall towards the interior of the vessel to define a discharge end of a first compartment on one side of the dividing wall and a receiving end of a second compartment on the other side thereof;

(c) at least one distributor for distributing fluidizing fluid into the bottom of each compartment for fluidizing a bed of fluidizable particles which, when present, is supported above and bounded by said distributor;

(d) each distributor comprising a substantially horizontal first distributor portion extending, at a first level, from the receiving end of the respective compartment to an edge region of the distributor portion at a location part-way towards the discharge end of the compartment; a substantially horizontal second distributor portion extending at a second level, higher than the said first level, from the discharge end of the compartment to an edge region of the second distributor portion which is located substantially vertically above the said edge region of the first distributor portion; a substantially vertical step connecting the edge regions of the first and second distributor portions; and a plenum defined beneath each distributor portion for the supply of fluidizing fluid to each distributor portion;

(e) said at least one dividing wall defining at least part of at least one particles-transfer port means which slopes downwardly from an entrance-opening on said one side of the dividing wall to an exit-opening on the other side thereof, the bottom of the port means on the said other side of the dividing wall being no lower than the said first level.

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## 4,517,163
## PROCESS FOR MAKING TITANIUM DIOXIDE CONCENTRATES

**Klaus Jödden; Gero Heymer, both of Erftstadt, and Hans-Werner Stephan, Cologne, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Feb. 24, 1983, Ser. No. 469,220**
**Claims priority, application Fed. Rep. of Germany, Mar. 24, 1982, 3210729**
**Int. Cl.³ C01G *23/07, 23/08***
**U.S. Cl. 423—75** **5 Claims**

1. In a process for making titanium dioxide concentrates by removing iron from material containing titanium oxide and iron oxides, wherein the titanium oxide-containing material is calcined at temperatures of 870° to 1300° C., and wherein the calcined titanium oxide-containing material is treated in countercurrent fashion wit a chlorine-containing gas at temperatures of 800° to 1300° C., the improvement according to which the titanium oxide-containing material is calcined under inert gas, whereby sintering of said material during chlorine-containing gas treatment is prevented.

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## 4,517,164
## PURIFICATION OF ALKALI METAL NITRATES

**Louis C. Fiorucci, Hamden, Conn., and Kevin M. Gregory, Woodridge, Ill., assignors to Olin Corporation, Cheshire, Conn.**

**Filed May 24, 1984, Ser. No. 613,666**
**Int. Cl.³ C01F *11/36***
**U.S. Cl. 423—184** **14 Claims**

1. The process for removing heavy metal contaminants from an impure alkali metal nitrate containing them, said impure alkali metal nitrate being comprised of a mixture of between about 30 and 70 percent by weight of sodium nitrate and between about 30 and about 70 percent by weight of potassium nitrate, wherein said process comprises:

a. admixing said impure alkali metal nitrate with sufficient water to form a concentrated aqueous solution thereof containing from between about 20 and about 70 percent by weight of alkali metal nitrate;

b. adjusting the pH of said concentrated aqueous solution to within the range from between 2 and about 7;

c. admixing sufficient reducing agent with said concentrated aqueous solution of alkali metal nitrate to provide at least the stoichiometric proportion necessary to react with heavy metal impurities contained therein, wherein said reducing agent is selected from the group consisting of alkali metal sulfide, alkali metal bisulfite, alkali metal borohydride, and hydrazine;

d. admixing sufficient base with the aqueous alkali metal nitrate solution containing said reducing agent to raise the pH of the resulting mixture to above about 6, whereby a precipitate of solid heavy metal contaminants forms within said aqueous solution; and

e. separating said solid heavy metal contaminants from the resulting purified aqueous solution of alkali metal nitrate.

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**4,517,165**

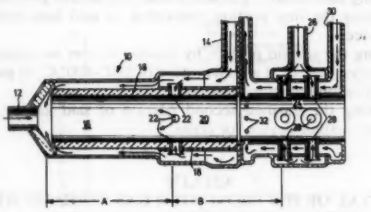
## COMBUSTION METHOD

**Michael P. Moriarty, Simi Valley, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Continuation-in-part of Ser. No. 239,943, Mar. 3, 1981, abandoned. This application Feb. 2, 1982, Ser. No. 344,067**

**Int. Cl.³ B01J** *8/00*

**U.S. Cl. 423—244** **11 Claims**



1. A method for the entrained flow combustion of a carbon- and sulfur-containing fuel for substantially reducing emission of gaseous sulfur compounds formed during the combustion of the fuel with a substoichiometric amount of oxygen, comprising:

introducing said fuel, an inorganic alkaline absorbent and an oxygen-containing gas into a first combustion sulfur capture zone of an entrained-flow combustor to form a fluent mixture therein of fuel and absorbent entrained in said gas, the oxygen being present in said zone in an amount to provide from about 25% to 40% of the total stoichiometric amount required for complete combustion of the fuel,

the inorganic alkaline absorbent being present in an amount to provide a molar ratio of alkaline absorbent to sulfur compounds of from about 1.0:1 to 3.0:1, said ratio including any alkaline absorbents contained in the fuel;

reacting said fuel and absorbent entrained in said oxygen-containing gas by maintaining them in said zone at a temperature of from about 1000° to 1800° K. for a time sufficient

(a) to gasify at least about 75% of the carbon content of the fuel and substantially all of the sulfur in the fuel,

(b) to combust the gasified fuel and oxygen to produce a fuel-rich stoichiometry in the gas phase, and

(c) to react in excess of about 70% of the fuel sulfur with the inorganic alkaline absorbent to form a solid alkaline sulfide compound; and

discharging the resultant combustion mixture having a substantially reduced gaseous sulfur compound content.

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**4,517,166**

## TWO-STAGE CHLORINATION PROCESS FOR THE PRODUCTION OF SOLID BLEACHING POWDER WITH A HIGH ACTIVE CHLORINE CONTENT

**Giuseppe Busacca, Milan, Italy, assignor to Consito SpA, Milan, Italy**

**Filed Jun. 12, 1984, Ser. No. 619,753**

**Int. Cl.³ C01B** *11/06*

**U.S. Cl. 423—474** **5 Claims**

1. Two-stage chlorination process for the production of bleaching powder with a high chlorine content characterised by

(a) suspending slaked lime with a calcium hydroxide content above 95% in an aqueous medium constituted by the mother liquor resulting from the liquid/solid separation of the reaction product from the second chlorination stage, with a weight ratio of the lime to the aqueous medium of between 1:2 and 1:2.5;

(b) passing gaseous chlorine into the suspension thus obtained and, agitation being maintained, adjusting the rate of immission of the chlorine to between 5 and 10 kg/h per 100 kg of calcium hydroxide present in the suspension, keeping the temperature at between 35° and 45° C., and stopping the immission of chlorine when more than 40% but less than 55% of the calcium hydroxide originally loaded in is still present in the suspension;

(c) separating the solid from the suspension by filtration or centrifuging and re-suspending the solid in water, with a weight ratio of the solid to the water of between 1:1 and 1.5:1;

(d) adding to the suspension a quantity of aqueous sodium hydroxide solution having a concentration of from 20% to 40% such as to bring the pH of the suspension to between 12 and 14;

(e) conducting a second chlorination stage by passing gaseous chlorine into the suspension at a rate of from 1.5 to 2 times the rate used in the first chlorination stage and keeping the temperature of the suspension at about 10 C. degrees below that of the first chlorination stage, continuing the immission of chlorine until the quantity of calcium hydroxide in the suspension is reduced to less than 0.2 parts by weight per 100 parts by weight of suspension;

(f) separating the solid from the suspension, by filtration or centrifuging, washing the solid residue with about ½ its weight of water and drying the washed product with hot air or under vacuum at a temperature no higher than 80° C. until the residual moisture content of the dried solid is reduced to between 5% and 10% by weight.

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**4,517,167**

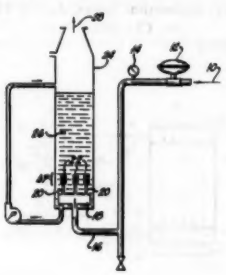
## CONTINUOUS REMOVAL OF ETHYLENE OXIDE FROM GASEOUS STREAMS

**Miron Popescu, Trevose, and Edward K. Gunsalus, Norristown, both of Pa., assignors to Johnson & Johnson, New Brunswick, N.J.**

**Filed May 25, 1983, Ser. No. 497,990**

**Int. Cl.³ B01D** *53/34*

**U.S. Cl. 423—245** **9 Claims**



1. A method for removing ethylene oxide from a gaseous stream comprising:

providing a vessel containing an aqueous acid solution, said solution having a normality ranging from about 0.35 to about 1.5;

providing said vessel with a gas diffusion means submerged in said solution;

continuously introducing said gaseous stream into said acid solution by diffusing said gas through said gas diffusion means, the pressure drop of the gas across said gas diffusion means being controlled to between about 1 and about 15 millimeters of mercury;

continuously withdrawing undissolved gas from the vessel;

whereby said gas being diffused in said diffusion means to a degree sufficient to result in at least 95% of said ethylene oxide introduced into said vessel being retained in the aqueous solution.

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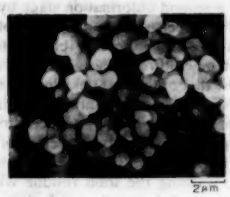
**4,517,168**

## GRINDING AMORPHOUS SILICON NITRIDE POWDER PRIOR TO HEATING TO PRODUCE CRYSTALLINE SILICON NITRIDE POWDER

**Takashi Kawabito; Yoshinori Himukashi, and Tetsuo Yamada, all of Ube, Japan, assignors to UBE Industries, Ltd., Yamaguchi, Japan**

**Filed Jul. 26, 1983, Ser. No. 517,420**
**Claims priority, application Japan, Jul. 27, 1982, 57-129572**
**Int. Cl.³ C01B *21/068;* C04B *35/58***
**U.S. Cl. 423—344** **4 Claims**




1. A process for producing equiaxed crystalline silicon nitride powder having an average diameter of not more than 1.5 microns by heating amorphous silicon nitride powder under an inert or reducing gas atmosphere, wherein said amorphous silicon nitride powder is ground prior to heating and subsequently maintained at a temperature of 1250° C. to 1430° C. for at least one hour.

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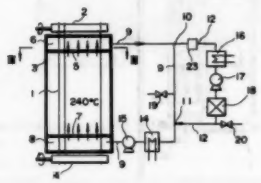
**4,517,169**

## METHOD OF PRODUCING CARBON FIBERS

**Atsushi Sumida, Ehime; Keiichiro Ozaki, Iyo, and Shizuo Watanabe, Ehime, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan**

**Filed Jun. 2, 1983, Ser. No. 500,434**
**Claims priority, application Japan, Jun. 2, 1982, 57-92971**
**Int. Cl.³ D01F *9/14***
**U.S. Cl. 423—447.4** **17 Claims**




1. In a method for producing carbonizable oxidized fibers comprising:
introducing the fibers to be oxidized into a heat-treating device; and
oxidizing the fibers in said heat-treating device with an appropriate oxidizing gas at a temperature sufficient to effect oxidation; the improvement comprising
withdrawing the spent oxidizing gas from said heat-treating device as an exhaust gas;
dividing said exhaust gas into a first and second portion;
returning the first portion, untreated, to said heat-treating device;
treating the second portion by passing it over an oxidation catalyst system at a temperature of 280°–400° C. to purify said second portion; and
returning the purified second portion of said gas to said heat-treating device for reuse.

17. In a method for producing carbon fibers comprising:
introducing fibers to be oxidized into a heat-treating device;
oxidizing the fibers in said heat-treating device with an appropriate oxidizing gas at a temperature sufficient to effect oxidation to produce oxidized fibers and carbonizing the oxidized fibers in a carbonizing furnace; the improvement comprising
withdrawing the spent oxidizing gas from said heat-treating device as an exhaust gas;
dividing said exhaust gas into a first and second portion;
returning the first portion, untreated, to said heat-treating device;
treating the second portion by passing it over an oxidation catalyst system at a temperature of 280°–400° C. to purify said second portion; and
returning the purified second portion of said gas to said heat-treating device for resue.

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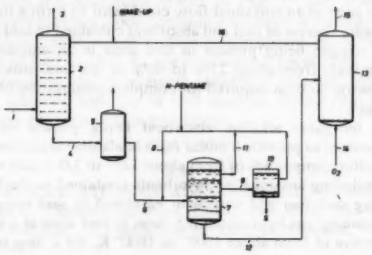
**4,517,170**

## REMOVAL OF $H_2S$ FROM SOUR GAS STREAMS WITH SUBSEQUENT SULFUR SEPARATION

**Miro E. Klecka, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed Dec. 20, 1982, Ser. No. 451,706**
**Int. Cl.³ C01B *17/05;* B01D *53/34***
**U.S. Cl. 423—573 R** **24 Claims**



1. A process for the removal of $H_2S$ from a sour gaseous stream comprising
(a) contacting the sour gaseous stream in a contacting zone with an aqueous reaction solution at a temperature below the melting point of sulfur, the solution comprising an effective amount of an oxidizing polyvalent metal chelate of nitrilotriacetic acid, or mixture of such chelates, to produce a sweet gas stream and an aqueous admixture containing sulfur and reduced reactant;
(b) removing aqueous admixture from the contacting zone;
(c) contacting aqueous admixture in an extraction zone with a liquid composition selected from compounds having the formula $C_nH_{2(n+1)}$, wherein n is a number from 4 through 8, and mixtures thereof, in an amount sufficient to remove at least the bulk of the sulfur from said admixture and form a separate phase containing sulfur and said composition, and forming a three phase mass comprising an upper mass containing solid sulfur and said liquid composition, and a lower phase in contact with said upper mass, said lower phase comprising aqueous admixture containing reduced reactant;
(d) separating at least a portion of the upper mass, and recovering sulfur from the portion separated;
(e) separating aqueous admixture containing reduced reactant from the lower phase, and regenerating said separated aqueous admixture in a regeneration zone to produce an aqueous admixture containing a regenerated reactant;

(f) returning aqueous admixture from the regeneration zone to the contacting zone.

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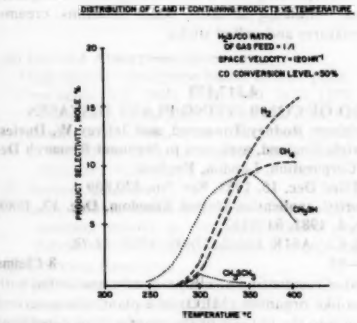
**4,517,171**

## SYNTHESIS OF $H_2$ AND $CH_4$ FROM $H_2S$ AND CO

**Charles T. Ratcliffe, Pittstown, N.J., and Petrus J. Tromp, Amsterdam, Netherlands, assignors to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Jun. 29, 1984, Ser. No. 626,458**
**Int. Cl.³ C01B *31/26***
**U.S. Cl. 423—648 R** **19 Claims**




1. A process for producing hydrogen and methane from a gaseous feed comprising a mixture of CO and $H_2S$, said process comprising contacting said feed, at a temperature of at least about 275° C., with a catalyst comprising rutile titania for a time sufficient to convert at least a portion of said feed to said hydrogen and methane.

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**4,517,172**

## PLAQUE DISCLOSING AGENT

**George L. Southard, Fort Collins, Colo., assignor to Vipont Laboratories, Inc., Fort Collins, Colo.**

**Filed Dec. 29, 1983, Ser. No. 566,916**
**Int. Cl.³ A61K *7/26, 35/78***
**U.S. Cl. 424—7.1** **8 Claims**

1. A method for visualizing plaque formation in the oral cavity and rendering such plaque formation visible to the naked eye under long wavelength ultraviolet light by applying to the oral cavity a sanguinarine salt selected from the group consisting of sanguinarine chloride, sanguinarine nitrate, sanguinarine sulfate, and a mixture of said salts precipitated from extracts of plants selected from the group consisting of *Sanguinaria canadensis, Macleaya cordata, Corydalis sevctvozii. C. ledebouni, Chelidonium majus,* and mixtures thereof.

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**4,517,173**

## MUCOUS MEMBRANE-ADHERING FILM PREPARATION AND PROCESS FOR ITS PREPARATION

**Hidenori Kizawa; Norimasa Fujiyama, both of Tokyo; Jitsuo Kobayashi, Kanagawa, and Akinori Ito, Niigata, all of Japan, assignors to Nippon Soda Co. Ltd., Tokyo, Japan**

**PCT No. PCT/JP81/00254, § 371 Date May 25, 1982, § 102(e) Date May 25, 1982, PCT Pub. No. WO82/01129, PCT Pub. Date Apr. 15, 1982**
**PCT Filed Sep. 25, 1981, Ser. No. 385,647**
**Claims priority, application Japan, Sep. 26, 1980, 55/33947**
**Int. Cl.³ A61L *15/03;* A61F *13/00;* A61K *9/70***
**U.S. Cl. 424—16** **2 Claims**

1. A mucous membrane-adhering film preparation with a flat contact side so formed as to be applied to an oral cavity and to adhere onto a mucous membrane, said preparation consisting of at least three layers, namely, a pharmaceutical layer (a), a poor water-soluble layer (b), and an intermediate layer (c), wherein:

(a) said pharmaceutical layer (a) is a material selected from the group consisting of predonisolone and allantoin together with water-solluble cellulose derivatives selected from the group consisting of hydroxypropyl cellulose, methyl cellulose, hydroxy propyl methyl cellulose and mixtures thereof, as a thin film base;

(b) said poor water-soluble layer (b) consists of water-soluble cellulose derivative together with poor-water-soluble components, said components being selected from the group consisting of shellack, higher fatty acids, and mixtures thereof; and,

(c) said intermediate layer consists of water-soluble cellulose derivatives not containing a pharmaceutical agent and not-containing poor water-soluble components.

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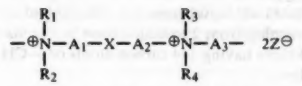
**4,517,174**

## HAIR TREATMENT COMPOSITIONS BASED ON POLYCATIONIC POLYMERS

**Bernard Jacquet, Antony; Gérard Lang, Epinay-sur-Seine; Alain Malaval, Aulnay-sous-Bois; Serge Forestier, Claye Souilly, and Do Le Trung, Drancy, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France**

**Division of Ser. No. 217,411, Dec. 17, 1980, Pat. No. 4,411,884. This application Sep. 21, 1983, Ser. No. 534,366**
**Claims priority, application France, Dec. 21, 1979, 79 31431**
**Int. Cl.³ A61K *7/06, 7/135***
**U.S. Cl. 424—62** **13 Claims**

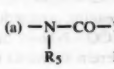
1. A hair dye composition comprising an aqueous solution of a quaternized polymer containing units of the formula

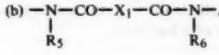


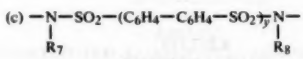
$R_1$, $R_2$, $R_3$ and $R_4$ each independently represent a hydrocarbon group, or at least one of the pairs $R_1$, $R_2$ and $R_3$, $R_4$ represents together with the nitrogen atom to which it is attached a heterocycle optionally containing an oxygen or sulfur heteroatom;

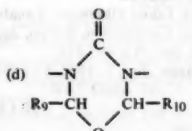
$A_1$ and $A_2$, each independently, represent linear or branched alkylene or arylene, substituted or not, containing up to 20 carbon atoms;

X represents a bivalent group of the formula

(a) 

(b) 

(c) 

(d) 

(e) —CO—NH—,

(f) —CO—O—,

(g) —O—CO—NH—,

(h) —CO—$X_2$—CO—,

(i) —CO—$X'_2$—CO—, or

(j) —O—CO—$X_3$—CO—O—,

wherein

y is equal to 0 or 1,

$R_5$, $R_6$, $R_7$, $R_8$, $R_9$ and $R_{10}$ represent hydrogen or lower alkyl,

$X_1$ represents alkylene, alkylene including an —S—S— group, alkenylene, arylene, diaminoalkylene, diaminoarylene, dioxyalkylene, dioxyarylene or polyoxyalkylene, or $X_1$ represents a direct covalent bond,

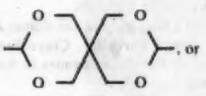
$X_2$ represents diaminoalkylene, dioxyalkylene or polyoxyalkylene bivalent group,

$X'_2$ represents dithioalkylene,

$X_3$ represents alkylene, cycloalkylene, arylene, diaminoalkylene, diaminocycloalkylene or diaminoarylene,

$A_3$ represents $—B_1—Y—B_2$, wherein $B_1$ and $B_2$ represent alkylene or arylene and Y has the same meaning as X above, or

Y represents



, or

$A_3$ represents $—B_3—Y_1—B_4$, wherein $B_3$ and $B_4$ represent arylene and $Y_1$ represents linear or branched alkylene, or linear or branched alkylene substituted by at least one —OH or =O group, or $Y_1$ represents a heteroatom selected from oxygen, sulfur or nitrogen, or

$A_3$ represents

(a) $—E—O—D)_{z'}$, O—E— or

(b) —E—O—G—O—E—, wherein

z' is a number ranging from 2 to 600,

E represents alkylene having 1–4 carbon atoms or —$CH_2$—CHOH—$CH_2$—,

D represents a bivalent hydrocarbon group containing 1–5 carbon atoms, and

G represents alkylene, cycloalkylene, arylene or aralkylene, or

when X is other than —CO—$X_2$—CO—, $A_3$ represents linear or branched alkylene or hydroxyalkylene, alkenylene or hydroxyalkenylene, cycloalkylene, or cycloalkenylene, containing up to 20 carbon atoms;

and $Z^{\ominus}$ represents a halide anion;

with the proviso that when X represents —NH—CO—NH—, $A_3$ represents $—E—(O—D)_z—O—E—$ or $—B_1—Y—B_2$, wherein Y has the meaning given for X above except for the value —NH—CO—NH—, or $A_3$ represents —E—O—G—O—E— wherein E and G have the meanings given above with the proviso that E and G are not simultaneously alkylene;

and a hair dyeing amount of a hair dye.

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**4,517,175**

## HAIR COSMETICS

**Hidetoshi Iwabuchi, Sakura, and Takeo Okumura, Funabashi, both of Japan, assignors to Kao Corporation, Tokyo, Japan**

**Filed May 23, 1983, Ser. No. 497,410**

**Claims priority, application Japan, Jun. 7, 1982, 57-96343**

**Int. Cl.³ A61K** *7/06, 37/00;* **A45D** *7/00*

**U.S. Cl. 424—70** **10 Claims**

1. A hair cosmetic, comprising:

(a) at least one flavanol derivative selected from the group consisting of epicatechin, epigallocatechin, epicatechin gallate, epigallocatechin gallate, catechin, and gallocatechin; and

(b) at least one peptide compound selected from the group consisting of collagen, keratin and silk.

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**4,517,176**

## ANTICHOLINERGIC GLUCURONIDE COMPOUNDS AND ANTIPERSPIRANT USE THEREOF

**Carl B. Felger, College Park, Md., assignor to The Gillette Company, Boston, Mass.**

**Filed Jun. 13, 1983, Ser. No. 504,018**

**Int. Cl.³ A61K** *7/32, 7/34, 7/38, 9/12*

**U.S. Cl. 424—47** **6 Claims**

1. An antiperspirant composition comprising about 0.1% by weight up to 20% by weight of a material selected from the group consisting of the O-β-D-glucuronide of anticholinergic compounds having a primary alcohol and base acid addition salts thereof, incorporated into a dermatologically acceptable carrier lotions, ointments, aerosols, water solutions, creams, pulverulent mixtures and gelled sticks.

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**4,517,177**

## METHOD OF COMBATTING PLANT DISEASES

**Peter G. Markham; Rodney Townsend, and Jeffrey W. Davies, all of Norwich, England, assignors to National Research Development Corporation, London, England**

**Filed Dec. 15, 1981, Ser. No. 330,859**

**Claims priority, application United Kingdom, Dec. 17, 1980, 8040438; Apr. 1, 1981, 8110117**

**Int. Cl.³ A61K** *39/12, 37/00;* **A01N** *63/00*

**U.S. Cl. 424—93** **8 Claims**

1. A method of combatting a yellows disease associated with a mycoplasma-like organism (MLO) in a plant, characterised by introducing into the phloem of the plant a virus capable of growing in the MLO; said virus being associated with *Spiroplasma citri* and being capable, when introduced into the plant phloem, of imparting to the plant resistance to the MLO-associated disease.

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**4,517,178**

## NOVEL ANTIBIOTIC 76-11, PROCESS FOR THE PRODUCTION THEREOF, ANTICOCCIDIOSIS AGENT AND DOMESTIC ANIMALS GROWTH ACCELERATOR COMPRISING THE SAME AS AN EFFECTIVE INGREDIENT

**Kiyoshi Isono, Niiza; Goto Nakamura, Urawa, and Shigeo Fujita, Tokyo, all of Japan, assignors to Rikagaku Kenkyusho, Wako and Kaken Kagaku Kabushiki Kiasha, Tokyo, both of, Japan**

**Continuation-in-part of Ser. No. 353,641, Mar. 1, 1982, abandoned. This application Jun. 13, 1983, Ser. No. 502,533**

**Claims priority, application Japan, Aug. 4, 1981, 56-122210; Dec. 22, 1981, 56-207464**

**Int. Cl.³ A61K** *35/74;* **C12P** *1/06, 1/04*

**U.S. Cl. 424—122** **7 Claims**

1. The antibiotic 76-11 having the following physicochemical and biological properties:

(1) Elemental Analysis:
Free acid: C; 62.61%, H; 8.27%, N; 0%
Na salt: C; 60.57%, H; 8.04%, N; 0%,
The antibiotic containing no element other than carbon, hydrogen and oxygen;

(2) Molecular Weight:
843 (measured by a titration method)
873 (measured by FD mass spectrum method)

(3) Melting Point:
Free acid: 108°–112° C.
Na salt: 210°–212° C. (Decomposed)

(4) Specific Rotatory Power:
$[\alpha]_D^{25}$ + 36.6° (C = 0.382, in chloroform solution)

(5) Ultraviolet Absorption Spectrum:
The maximum absorption bands;

In MeOH and HCl—MeOH:

-continued

$\lambda_{max}$ = 217 mμ ($E^{1\%}_{1\ cm}$ 303)

262 mμ ($E^{1\%}_{1\ cm}$ 182)

301 mμ ($E^{1\%}_{1\ cm}$ 68)

In alkaline MeOH:

$\lambda_{max}$ = 260 mμ ($E^{1\%}_{1\ cm}$ 87)

308 mμ ($E^{1\%}_{1\ cm}$ 50)

(6) Infrared Absorption Spectrum:
Main specific absorption bands in KBr plate:
Free acid: 3450, 2960, 1720, 1640, 1610, 1578, 1446, 1380, 1315, 1292, 1250, 1209, 1151, 1100, 1035, 975, 940 $cm^{-1}$
Na salt: 3390, 2960, 1718, 1640, 1609, 1578, 1450, 1380, 1340, 1316, 1250, 1197, 1152, 1108, 1092, 1060, 1040, 1002, 980, 930 $cm^{-1}$
(7) Solvent Solubility:
Easily soluble in benzene, chloroform, ethyl acetate and acetone, soluble in methanol, ethanol and dimethylformamide, and hardly soluble in water and hexane
(8) Coloring Reactions:
Positive to potassium permanganate reaction but negative to periodic acid-benzidine reaction
(9) Basicity, Acidity or Neutrality:
Acidic substance, pKa' 4.6 (in 66.7% dioxane)
(10) Color:
Colorless crystal
(11) Antimicrobial Activity:
Growth inhibition against Gram positive coccus, bacillus and acid-fast bacteria reveals in the concentration of 0.4 mcg/ml.

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**4,517,179**

## RAPID DISSOLVING, UNIFORM DRUG COMPOSITIONS AND THEIR PREPARATION

**Yegnasawami Raghunathan, Fairport, N.Y., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 490,056, Apr. 29, 1983, abandoned. This application Mar. 6, 1984, Ser. No. 586,605**
**Int. Cl.³ A61K *33/06, 45/08***
**U.S. Cl. 514—249** **14 Claims**

1. A rapid dissolving pharmaceutical composition prepared from a dry mixture comprising from about 0.05 to 12.5 weight percent of a low solubility drug having a particle size distribution such that the major portion by weight of the particles are less than about 155 μm in diameter, from about 10 to 90 weight percent of microcrystalline cellulose, from about 10 to 90 weight percent of unmilled or coarse milled dibasic calcium phosphate, from about 0.1 to 3.0 percent of lubricant, and from about 1 to 20 weight percent of starch.

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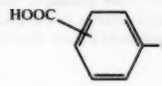
**4,517,180**

## PEPTIDES, PROCESS FOR PREPARING THE SAME AND PSYCHODEPRESSANT COMPOSITIONS CONTAINING THE SAME

**Noboru Yanaihara, Shizuoka; Nobuo Sugiura, Hashima, and Takashi Hiyama, Tokushima, all of Japan, assignors to Amano Pharmaceutical Co., Ltd, Aichi and Otsuka Pharmaceutical Co., Ltd., Tokyo, both of, Japan**

**Filed Oct. 27, 1983, Ser. No. 545,994**
**Claims priority, application Japan, Oct. 27, 1982, 57-189740; Jul. 20, 1983, 58-133065**
**Int. Cl.³ A61K *37/00; C07C 103/52***
**U.S. Cl. 514—16** **12 Claims**

1. A peptide represented by the formula
R—Tyr($SO_3H$)—Met—Gly—Trp—Met—Asp—W—$NH_2$
wherein R is HOOC—A—CO—Asp— (wherein A is lower alkylene), pGlu—Asp—, HOOC—A—CO— (wherein A is lower alkylene) or



and W is Phe or $N^{\alpha}$-lower alkyl-Phe, or a salt thereof.

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**4,517,181**

## MAMMALIAN PGRF

**Nicholas C. Ling, San Diego; Frederick S. Esch, Oceanside; Peter Bohlen, Encinitas; Paul E. Brazeau, Jr., San Diego, and Roger C. L. Guillemin, La Jolla, all of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.**

**Filed Sep. 15, 1982, Ser. No. 418,248**
**Int. Cl.³ A61K *37/02; C07C 103/52***
**U.S. Cl. 514—12** **20 Claims**

1. A synthetic peptide having the formula:

H—Tyr—Ala—Asp—Ala—Ile—Phe—Thr—Asn—Ser—Tyr—Arg—Lys—Val—Leu—Gly—Gln—Leu—Ser—Ala—Arg—Lys—Leu—Leu—Gln—Asp—Ile—Met—Ser—Arg—Gln—Gln—Gly—Glu—$R_{34}$—Asn—Gln—Glu—$R_{38}$—Gly—$R_{40}$—$R_{41}$—R

wherein R is OH or $NH_2$, $R_{34}$ is Ser or Ala, $R_{38}$ is Arg or Ser, $R_{40}$ is Ala or Arg and $R_{41}$ is Arg, Arg-Ala, Arg-Ala-Arg or Arg-Ala-Arg-Leu, or a fragment of such peptide which fragment is biologically active to effect the release of GH, or a nontoxic salt of such peptide or peptide fragment.

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**4,517,182**

## 3-(HALOETHYL)-4-OXOPYRAZOLO-[5,1-d]-1,2,3,5-TETRAZINE-8-CARBOXAMIDE COMPOSITION

**Chia-Chung Cheng, Leawood, Kans., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 497,587, May 24, 1983,. This application Apr. 3, 1984, Ser. No. 594,919**
**Int. Cl.³ A61K *31/395, 31/55;* C07D *257/08***
**U.S. Cl. 514—413** **4 Claims**

1. A pharmaceutical composition for treating microbial infection in a dosage form comprising a microbe-inhibiting amount of a 3-(2 haloethyl)-4-oxopyrazolo[5,1-d]-1,2,3,5-tetrazine-8-carboxamide compound having the structural formula where Hal is a halogen, in combination with a pharmaceutically acceptable carrier.

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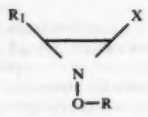
**4,517,183**

## N-SUBSTITUTED AZIRIDINE-2-CARBOXYLIC ACID DERIVATIVES

**Elmar Bosies, Weinheim; Wolfgang Kampe, Heddesheim; Max Thiel, Mannheim; Uwe Bicker, Lorsch, and Dietmar Boerner, Lampertheim-Hüttenfeld, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Division of Ser. No. 236,375, Feb. 20, 1981, Pat. No. 4,397,848, which is a continuation of Ser. No. 117,165, Jan. 3, 1980, abandoned. This application May 17, 1983, Ser. No. 495,548**
**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1979, 2906603**
**Int. Cl.³ C07D *203/22, 401/12, 403/12;* A61K *31/395***
**U.S. Cl. 514—183** **13 Claims**

1. A compound having the formula



wherein X is a carboxyl, a cyano, an alkoxycarbonyl or a carbamoyl radical optionally substituted by lower alkyl, cycloalkyl, aryl and/or acyl, R is a hydrogen atom, an aliphatic hydrocarbon radical of up to 8 carbon atoms which is substituted up to three times by halogen, alkoxy, hydroxyl, dialkylamino, dialkylaminoxy, cycloalkylamino, acylamino, acyl, nitro, alkylthio, alkylsulphinyl, alkylsulphonyl, cyano, carboxyl, alkoxycarbonyl and carbamoyl or by cycloalkyl or cycloalkenyl radicals optionally carrying up to three alkyl, alkoxy and alkoxycarbonyl radicals, or by norbornyl, adamantyl, tetrahydrofuryl, tetrahydropyranyl or thienyl, or by an aryl, hetaryl, aryloxy, arylthio, acyloxy, alkoxycarbonylamino and isothio-ureido radical, or R is a cycloalkyl or cycloalkenyl radical optionally substituted by up to three alkyl, alkoxy and oxo groups, or is norbornyl, adamantyl, tetrahydrofuryl, tetrahydropyranyl or thienyl, or is a hetaryl radical which can be substituted up to three times by halogen, alkoxy, alkyl, hydroxyl, alkoxycarbonyl, carbamoyl, dialkylamino, cycloalkylamino, acylamino, nitro, cyano, acyl, alkylthio, alkylsulphinyl, alkylsulphonyl, sulphamoyl, phenyl, trifluoromethyl, aryloxy, acyloxy or methylenedioxy radicals, and $R_1$ is a hydrogen atom or an alkyl or phenyl radical, with the proviso that when X is carbamoyl or an alkoxycarbonyl radical and $R_1$ is a hydrogen atom, R is not a benzyl radical, acyl as employed hereinabove being selected from the group consisting of formyl, acetyl, benzoyl, furoyl, tosyl, and methylsulphonyl, hetaryl as employed hereinabove being pyridyl, quinolyl, furyl, thienyl, benzofuryl, imidazolyl, pyrazolyl, thiazolyl, pyrimidinyl, pyridazinyl, s-triazolyl, 3-triazinyl or purinyl, alkyl as employed hereinabove unless otherwise specified containing up to 8 carbon atoms, cycloalkyl and cycloalkenyl as employed hereinabove containing 3 to 10 carbon atoms, and aryl being selected from the group consisting of phenyl, napthyl, anthracenyl, phenanthrenyl and fluorenyl; or a pharmacologically acceptable salt thereof.

9. An immunostimulating composition of matter consisting essentially of an immunostimulating effective amount of a compound or salt according to claim 1 in admixture with a pharmaceutically acceptable diluent.

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**4,517,184**

## BENZODIOXOLE DERIVATIVES

**Ernst Habicht, Oberwil, and Paul Zbinden, Witterswil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 369,873, Apr. 19, 1982, Pat. No. 4,414,214. This application Aug. 8, 1983, Ser. No. 521,483**

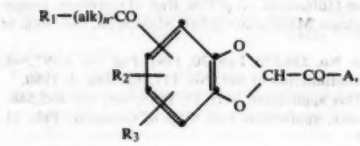
**Claims priority, application Switzerland, Apr. 24, 1981, 2698/81**

**The portion of the term of this patent subsequent to Nov. 8, 2000, has been disclaimed.**

**Int. Cl.³ A61K *31/455*; C07D *407/06***

**U.S. Cl. 514—212** **5 Claims**

1. A benzodiozole derivative of the formula I



(I)

in which

$R_1$ represents phenyl, thienyl, pyridyl or furyl, each of which is unsubstituted or substituted by lower alkyl, lower alkoxy, halogen, or dilower alkyl sulfamoyl,

alk represents an alkylene or alkylidene radical having a maximum of 5 carbon atoms,

n represents 0 or 1,

$R_2$ and $R_3$ each represents, independently of the other, hydrogen, lower alkyl, lower alkoxy or halogen, and

A represents the radical O-$R_4$, wherein $R_4$ represents hydrogen or lower alkyl, or A represents the radical

in which either $R_5$ and $R_6$ represents, independently of the other, hydrogen or lower alkyl, or $R_5$ and $R_6$ are bonded to one another and, together with the adjacent nitrogen atom, represent unsubstituted or lower alkyl-substituted tetra- to hexamethyleneimino or 4-morpholinyl, in the form of racemates or optical antipodes, an the salts of a compound of the formula I in which A represents $OR_4$ wherein $R_4$ represents hydrogen, with bases, and the acid addition salts of a compound of the formula I in which the radical $R_1$ has a basic character.

4. A pharmaceutical composition having diuretic activity comprising a therapeutically effective amount of a compound according to claim 1 or of a pharmaceutically acceptable salt of a compound according to claim 1 that is capable of salt formation, together with at least one pharmaceutical carrier.

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**4,517,185**

## 2-PYRROLIN-3-CARBONITRILE DERIVATIVES, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND THEIR ANTI-INFLAMMATORY AND ULCER PROTECTIVE ACTIVITY

**Hubert Barth, Emmendingen; Edgar Fritschi, St. Peter; Volker Ganser, Freiburg; Johannes Hartenstein, Stegen-Wittental; Manfred Herrmann, St. Peter, and Gerhard Satzinger, Denzlingen, all of Fed. Rep. of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.**

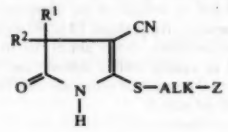
**Filed Mar. 25, 1983, Ser. No. 478,762**

**Claims priority, application Fed. Rep. of Germany, Apr. 3, 1982, 3212591**

**Int. Cl.³ C07D *401/04, 401/14*; A61K *31/44, 31/535***

**U.S. Cl. 514—232** **4 Claims**

1. A compound of the general formula:



I

wherein $R^1$ and $R^2$ are the same or different and are phenyl, or pyridyl rings optionally substituted by up to two halogen atoms, $C_{1-4}$ alkoxy radicals, $C_{1-4}$ dialkylamino radicals or trifluoromethyl radicals, Alk is a straight-chained or branched $C_{1-4}$ alkylene chain and Z is a hydrogen atom, with the proviso that when Alk is a straight-chained alkylene chain, Z can also be an amino radical of the general formula II:

II

in which $R^3$ and $R^4$ are the same or different and are hydrogen

atoms or methyl, ethyl, n-propyl or isopropyl radicals or, together with the nitrogen atom to which they are attached, can also form a pyrrolidino, piperidino, morpholino or piperazino radical.

3. A pharmaceutical composition, comprising a compound according to claim 1, in admixture with a pharmaceutical carrier and/or adjuvant.

4. A method of treating inflammation and gastrointestinal ulcers which comprises administering orally or parenterally to a host suffering therefrom with an effective amount of a pharmaceutical composition according to claim 3.

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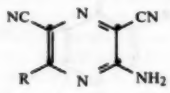
**4,517,186**

## 2-AMINO-3,5-DICYANO-6-(SUBSTITUTED)PYRAZINE ANTIMICROBIAL COMPOUNDS

**David B. R. Johnston, Warren, N.J., assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Sep. 30, 1982, Ser. No. 430,919**
**Int. Cl.³ C07D** *241/18, 241/20;* **A01N** *43/60*
**U.S. Cl. 514—255** **10 Claims**

1. A method of inhibiting the growth of bacteria and fungi comprising contacting said bacteria and fungi with a bactericidally and fungicidally effective amount of a compound of the formula:



(I.)

wherein:

R is mono- or di-, or substituted mono- or di-, loweralkylamino, wherein the loweralkyl substituents are hydroxy or loweralkanoyloxy; thiocyano; mercapto; straight or branched chain $C^{1-8}$alkylthio; mono- or di-substituted loweralkylthio wherein the substituents are hydroxy, amino, loweralkanoylamino, or loweralkoxycarbonyl; loweralkylsulfoxy; or loweralkylsulfonyl.

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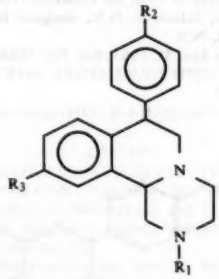
**4,517,187**

## 1,3,4,6,7-11B-HEXAHYDRO-7-PHENYL-2H-PYRAZINO[2,1-A]ISOQUINOLINES METHODS OF PREPARATION, AND USE AS ANTIDEPRESSANTS

**Ronald C. Griffith, Pittsford, N.Y., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Filed Oct. 18, 1982, Ser. No. 435,132**
**Int. Cl.³ C07D** *487/04;* **A61K** *31/495*
**U.S. Cl. 514—250** **18 Claims**

1. The compound



wherein $R_1$ is hydrogen, $C_1$–$C_7$ alkyl, $C_3$–$C_7$ cycloalkyl, $C_1$–$C_7$ alkanoyl, $C_7$–$C_8$ phenylalkyl, phenylacetyl, phenyl or benzoyl, and $R_2$ and $R_3$ are the same or independently hydrogen, halogen, hydroxy, $C_1$–$C_7$ alkanoyloxy, nitro, amino $C_1$-$C_7$aminoalkyl, trifluoromethyl, $C_1$–$C_7$alkyl, $C_1$–$C_7$alkoxy, $C_1$–$C_7$ alkanoyl, cyano, $C_1$–$C_7$ alkylamino and acid addition salts thereof.

18. A process for relieving depression in warm-blooded animals requiring such relief which comprises providing to said animals an effective dosage of the compound of claim 1 in association with a compatible pharmaceutical carrier.

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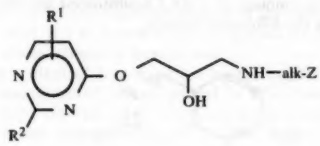
**4,517,188**

## 1-PYRIMIDINYLOXY-3-HETARYL-ALKYLAMINO-2-PROPANOLS

**John E. Lawson, Evansville, Ind.; William L. Matier, Libertyville, Ill., and Herbert R. Roth, Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.**

**Filed May 9, 1983, Ser. No. 493,124**
**Int. Cl.³ C07D** *239/47;* **A61K** *31/505*
**U.S. Cl. 514—394** **36 Claims**

1. A pyrimidine compound of Formula IA

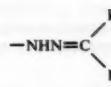


(IA)

or a pharmaceutically acceptable salt thereof wherein

$R^1$ is hydrogen, $C_{1-6}$ alkyl, amino, $C_{1-4}$ alkylcarbonylamino, cyano, or halogen;

$R^2$ is —$NHNH_2$ or

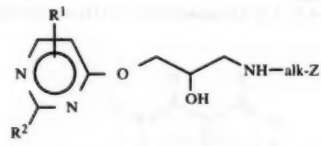


with $R^a$ and $R^b$ being the same or different and representing $C_{1-3}$ alkyl or phenyl;

alk is $C_{1-6}$ alkylene, either straight chain or branched; and

Z is selected from the group consisting of hydrogen, phenyl, indole, thiophene, benzothiophene, benzofuran, and benzimidazole.

4. A pyrimidine compound of Formula IB



(IB)

or a pharmaceutically acceptable salt thereof wherein

$R^1$ is hydrogen, $C_{1-6}$ alkyl, amino, $C_{1-4}$ alkylcarbonylamino, cyano, or halogen;

$R^2$ is hydrogen, amino, $C_{1-4}$ alkylcarbonylamino, halogen, or phenyl;

alk is $C_{1-6}$ alkylene, either straight chain or branched; and

Z is selected from the group consisting of indole, thiophene, benzothiphene, benzofuran, and benzimidazole.

**4,517,189**

## 2,6,7,8-SUBSTITUTED QUINAZOLINES, PROCESS FOR PRODUCTION THEREOF, AND USE THEREOF

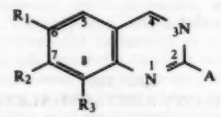
**Masayuki Ishikawa, Tokyo; Hiroshi Azuma, Asaka; Akiko Sugimoto, Hino; Noriko Takahashi, Tokyo, and Yoshimi Takashima, Akishima, all of Japan, assignors to Showa Denko K.K., Tokyo, Japan**

**Filed Aug. 2, 1983, Ser. No. 519,235**

**Int. Cl.³ A61K** *31/505;* **C79D** *239/74*

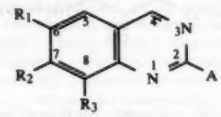
**U.S. Cl. 514—259** **10 Claims**

**1.** A 2,6,7,8-substituted quinazoline represented by the following formula



wherein $R_1$ and $R_3$ each represent a lower alkyl group, $R_2$ represents a lower alkoxy-carbonyl group, and A represents a lower alkyl group, or a phenyl or benzyl group which is unsubstituted or substituted by a substituent selected from the class consisting of halogen atoms, a trifluoromethyl group and lower alkyl groups, or its pharmaceutically acceptable acid addition salt.

**6.** A pharmaceutical composition composed of a pharmaceutically effective amount of a 2,6,7,8-substituted quinazoline represented by the following formula



wherein $R_1$ and $R_3$ each represents a lower alkyl group, $R_2$ represents a lower alkoxy-carbonyl group, and A represents a lower alkyl group, or a phenyl or benzyl group which is unsubstituted or substituted by a substituent selected from the class consisting of halogen atoms, a trifluoromethyl group and lower alkyl groups, or its pharmaceutically acceptable acid addition salt, and a pharmaceutically acceptable diluent or carrier.

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**4,517,190**

## 5-ALKYL-1,6-NAPHTHYRIDIN-2(1H)-ONES AND CARDIOTONIC USE THEREOF

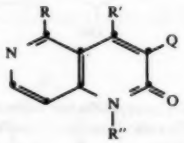
**George Y. Lesher, Schodack, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 404,454, Aug. 2, 1982, Pat. No. 4,415,580. This application Jun. 9, 1983, Ser. No. 502,858**

**Int. Cl.³ C07D** *471/04;* **A61K** *31/44*

**U.S. Cl. 514—300** **19 Claims**

**1.** 1-R″-3-Q-4-R′-5-R-1,6-naphthyridin-2(1H)-one having the formula



or a pharmaceutically acceptable acid-addition or cationic salt thereof, where R is lower-alkyl, R′ is hydrogen or methyl, R″ is hydrogen or lower-alkyl, and Q is hydrogen, hydroxy or amino.

**14.** A method for increasing cardiac contractility in a patient requiring such treatment which comprises administering orally or parenterally in a solid or liquid dosage form to such patient a cardiotonically effective amount of the 1-R″-3-Q-4-R′-5-R-1,6-naphthyridin-2(1H)-one of claim **1** or 1,6-naphthyridin-2(1H)-one or pharmaceutically acceptable acid-addition or cationic salt thereof, where R, R′ and R″ have the meanings given in claim **1** and Q is hydrogen, hydroxy or amino.

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**4,517,191**

## 1-AMINO-1,8-NAPHTHYRIDINE COMPOUNDS USEFUL AS BACTERICIDES

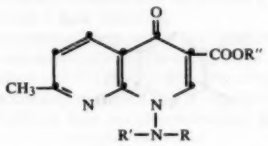
**Mark P. Wentland, North Greenbush, and Denis M. Bailey, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Filed Sep. 29, 1983, Ser. No. 537,195**

**Int. Cl.³ A61K** *31/44;* **C07D** *471/04*

**U.S. Cl. 514—300** **12 Claims**

**1.** A compound having the formula



wherein R is hydrogen or formyl; and R′ and R″ are hydrogen or lower-alkyl; or an alkali metal or pharmaceutically acceptable amine salt of a compound where R″ is hydrogen.

**2.** A compound according to claim **1** wherein R and R″ are hydrogen and R′ is lower-alkyl.

**11.** A composition for combatting bacteria, which comprises an antibacterially effective amount of a compound according to claim **2** together with one or more pharmaceutically acceptable excipients.

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**4,517,192**

## 6-ALKYL-5-[4-(ALKYLSULFINYL OR ALKYLSULFONYL)PHENYL]-2(1H)-PYRIDINONES AND THEIR USE AS CARDIATONICS

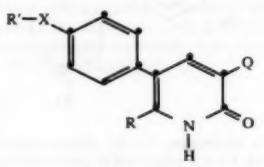
**George Y. Lesher, Schodack, N.Y., assignor to Sterling Drug Inc., New York, N.Y.**

**Filed Jan. 31, 1983, Ser. No. 462,661**

**Int. Cl.³ C07D** *211/42, 211/86;* **A61K** *31/44*

**U.S. Cl. 514—345** **11 Claims**

**1.** 3-Q-5-[4-(R′-X)phenyl]-6-R-2(1H)-pyridinone having the formula



where R and R′ are each methyl or ethyl, X is sulfinyl when Q is hydrogen or cyano, or X is sulfonyl when Q is cyano.

**4,517,193**

## PESTICIDAL BENZOYLUREA COMPOUNDS

**Martin Anderson, Whitstable, England, assignor to Shell Oil Company, Houston, Tex.**

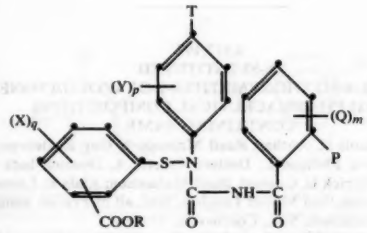
**Filed Sep. 7, 1983, Ser. No. 529,909**

**Claims priority, application United Kingdom, Sep. 16, 1982, 8226386**

**Int. Cl.³ C07C *145/04*; A01N *47/34***

**U.S. Cl. 514—471** **4 Claims**

**1**. A benzoylurea compound of formula:



(I)

in which each of P and Q independently represents a halogen atom or an alkyl group; m represents 0, 1 or 2; R represents an alkyl, alkenyl or alkynyl group which may be substituted by one or more halogen atoms or one of alkoxy, haloalkoxy, hydroxy, carboxy, alkoxycarbonyl, cycloalkyl, tetrahydrofuryl, a group $—O—(CH_2CH_2O)_n$ alkyl wherein n=1, 2, 3 or 4, or phenyl which may be substituted by halogen, alkyl, haloalkyl, alkoxy, haloalkoxy, alkenyl, haloalkenyl, nitro or cyano; a cycloalkyl group which may be substituted as indicated above, or by alkyl or haloalkyl; or a phenyl group which may be substituted as indicated above; a hydrogen atom; one equivalent of an alkali metal or alkaline earth metal; or an ammonium or $C_1$–$C_6$ alkyl-substituted ammonium group; each X independently represents a halogen atom, a cyano, nitro or carboxy group, or an alkyl, alkoxy, alkylthio, cycloalkyl, cycloalkyloxy, cycloalkylthio, alkenyl, alkenylthio, alkylcarbonyl, alkoxycarbonyl, alkylsulphonyl, alkynyl, phenyl, phenoxy, phenylthio or amino group which groups may be substituted as described for the moiety R, above; q=0, 1, 2, 3 or 4; T represents a halogen atom, an alkyl, haloalkyl, alkoxy, haloalkoxy, alkenyloxy or haloalkenyloxy group, or a phenoxy or pyridyloxy group which group may be substituted by one or more of halogen atoms, and nitro, alkyl, haloalkyl and cyano groups; each Y independently represents a halogen atom or a nitro, cyano, alkyl or haloalkyl group; and p=0, 1, 2, 3 or 4.

**4**. An insecticidal and miticidal composition that comprises an effective amount of a compound of claim **1** together with an inert carrier.

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**4,517,194**

## AZOLYLMANDELIC ACID DERIVATIVES AND USE THEREOF FOR CONTROLLING MICROORGANISMS

**Walter Kunz, Oberwil, Switzerland, and Wolfgang Eckhardt, Lörrach, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

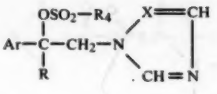
**Filed Jun. 13, 1983, Ser. No. 503,966**

**Claims priority, application Switzerland, Jun. 25, 1982, 3922/82**

**Int. Cl.³ A01N *43/50, 43/64*; C07D *233/60, 249/06***

**U.S. Cl. 514—184** **25 Claims**

**1**. A compound selected from the group consisting of (i) a mandelic acid derivative of the formula

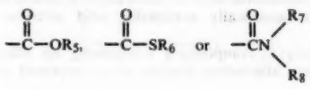


wherein

X is N or CH;

Ar is an aryl group selected from the group consisting of phenyl, biphenylyl and naphthyl which aryl group is unsubstituted or substituted with one, two or three like or different members selected from the group consisting of nitro, halo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, and haloalkoxy of 1 to 3 carbon atoms;

R is group of the formulae



in which

$R_5$ is alkyl of 1 to 4 carbon atom, phenyl or benzyl, said phenyl and benzyl groups being unsubstituted or substituted with nitro, halo or methyl,

$R_6$ is alkyl of 1 to 3 carbon atoms; and

each of $R_7$ and $R_8$ independently of the other is hydrogen, alkyl of 1 to 3 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, phenyl or benzyl; and

$R_4$ is alkyl of 1 to 6 carbon atoms, unsubstituted phenyl, unsubstituted benzyl, phenyl or benzyl substituted with halo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, haloalkoxy of 1 to 4 carbon atoms or cyano, or

in which

$R_9$ is alkyl of 1 to 6 carbon atoms and

$R_{10}$ is hydrogen, alkyl of 1 to 4 carbon atoms, haloalkylsulfenyl, $—SC_6H_5$ or $—SC(CH_3)_2CN$,

and (ii) the acid addition salts and metal complexes thereof.

**24**. A method of combatting fungal and bacterial attack on cultivated plants which comprises applying to the plants or their locus an effective amount of a compound according to claim **1**.

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**4,517,195**

## PYRROLO[1,2-b][1,2,5]TRIAZEPINES AND PHARMACEUTICAL COMPOSITIONS THEREOF

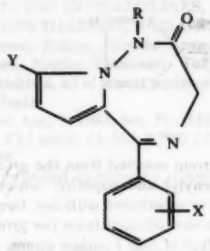
**Richard C. Effland; Joseph T. Klein, both of Bridgewater, and R. Richard L. Hamer, Budd Lake, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Filed Jul. 2, 1984, Ser. No. 627,329**

**Int. Cl.³ A61K *31/55*; C07D *255/02, 255/04***

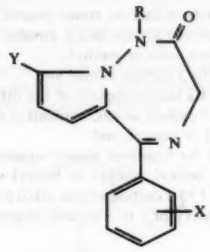
**U.S. Cl. 514—413** **32 Claims**

**1**. A compound of the formula



where X is hydrogen, halogen, loweralkyl, $CF_3$ or $NO_2$; Y is hydrogen, halogen or loweralkyl; and R is hydrogen, loweralkyl, loweralkylaminoloweralkyl or diloweralkylaminoloweralkyl, or a pharmaceutically acceptable acid addition salt thereof.

32. An anxiolytic composition comprising an effective amount of anxiety alleviating amount of a compound of the formula



where X is hydrogen, halogen, loweralkyl, $CF_3$ or $NO_2$; Y is hydrogen, halogen or loweralkyl; and R is hydrogen, loweralkyl, loweralkylaminoloweralkyl, or diloweralkylaminoloweralkyl, or a pharmaceutically acceptable acid addition salt thereof.

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**4,517,196**

## TRICYCLIC THIAZOLYLOXAMIC ACIDS AND THEIR DERIVATIVES, THEIR PREPARATION, AND THERAPEUTIC AGENTS CONTAINING THESE COMPOUNDS

**Rainer Schlecker, Bissersheim; Ludwig Friedrich, Bruehl, and Dieter Lenke, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

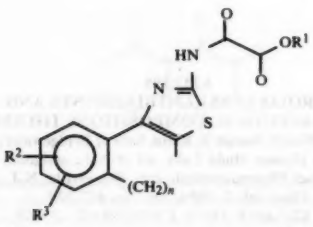
**Filed Aug. 26, 1982, Ser. No. 411,612**

**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1981, 3135250**

**Int. Cl.³ C07D *277/60;* A61K *31/425***

**U.S. Cl. 514—371** **5 Claims**

1. A compound of the formula I



I

where n is an integer from 1 to 6, and one hydrogen atom in the $-(CH_2)_n-$ group may be replaced by lower alkyl of 1 to 6 carbon atoms or by phenyl, or two geminal hydrogen atoms may be replaced by oxygen, $R^1$ is hydrogen or a physiologically tolerated metal or amine cation, or is alkyl of 1 to 6 carbon atoms, $R^2$ and $R^3$ are identical or different and are each hydrogen, fluorine, chlorine, bromine, iodine, nitro or amino, or alkylamino, dialkylamino, acetylamino, alkoxy, alkylthio, alkylsulfenyl or alkylsulfonyl where each alkyl is of 1 to 6 carbon atoms, or are each hydroxyl, acetyl, cyano or carboxyl, or alkyl of 1 to 5 carbon atoms.

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**4,517,197**

## -N-SUBSTITUTED PHENYL-5-METHOXYMETHYL-2-OXAZOLIDINONES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

**Jean-Francois R. Ancher, Rueil Malmaison; Guy R. Bourgery, Colombes; Philippe L. Dostert; Colette A. Douzon, both of Paris; Patrick G. Guerret, Rueil Malmaison; Alain P. Lacour, La Varenne, and Michel Langlois, Buc, all of France, assignors to Delalande S.A., Courbevoie, France**

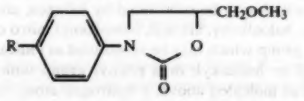
**Continuation of Ser. No. 265,501, May 20, 1981, abandoned. This application Jul. 29, 1983, Ser. No. 518,320**

**Claims priority, application France, Jun. 4, 1980, 80 12423**

**Int. Cl.³ C07D *263/24;* A61K *631/42***

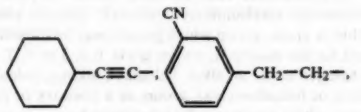
**U.S. Cl. 514—376** **9 Claims**

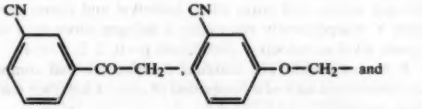
1. A compound having the formula

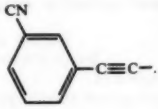


in which R is selected from the group consisting of

$CH_3—CO—(CH_2)_2—O—$, $CN—(CH_2)_5—$,







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**4,517,198**

## DIURETIC IMIDAZOLE DERIVATIVES

**Kauko O. A. Kurkela, and Arto J. Karjalainen, both of Oulu, Finland, assignors to Farmos Group Ltd., Turku, Finland**

**Filed Dec. 3, 1982, Ser. No. 446,717**

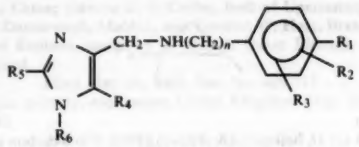
**Claims priority, application United Kingdom, Dec. 4, 1981, 8136646**

**Int. Cl.³ A61K *31/415;* C07D *233/64***

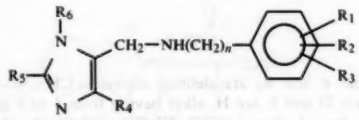
**U.S. Cl. 514—400** **18 Claims**

1. A method of producing in a subject a diuretic, antithrom-

botic or antihypertensive effect which comprises administering to such subject an effective amount of an imidazole of the formula:



or



wherein each of $R_1$, $R_2$ and $R_3$, which can be the same or different, is hydrogen, chloro, bromo, fluoro, methyl, ethyl, methoxy, amino, hydroxy or nitro; $R_4$ is hydrogen or alkyl of 1 to 7 carbon atoms; $R_5$ is hydrogen or a straight or branched alkyl group of 1 to 5 carbon atoms or a phenyl group; $R_6$ is hydrogen or an alkyl group of 1 to 7 carbon atoms or a benzyl group; and n is 0 or 1; provided that when n is 0 at least two of $R_1$, $R_2$ and $R_3$ must be other than hydrogen; and further provided that $R_1$, $R_2$ and $R_3$ cannot all be chloro and that two of $R_1$, $R_2$ and $R_3$ cannot be chloro when the third is hydrogen; or a non-toxic pharmaceutically acceptable acid addition salt thereof.

11. A method of producing in a subject a diuretic, antithrombotic or antihypertensive effect which comprises administering to such subject an effective amount of an imidazole as claimed in claim 1 or a non-toxic pharmaceutically acceptable acid addition salt thereof.

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**4,517,199**

## METHOD FOR LOWERING INTRAOCULAR PRESSURE USING PHENYLIMINO-IMIDAZOLES

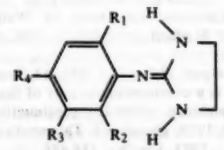
**Billie M. York, Jr., Fort Worth, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.**

**Continuation-in-part of Ser. No. 323,369, Nov. 20, 1981, abandoned. This application Aug. 3, 1983, Ser. No. 519,791**

**Int. Cl.³ A61K** *31/415*

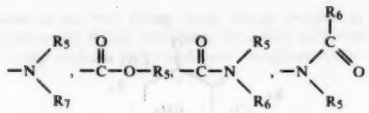
**U.S. Cl. 514—392** **14 Claims**

1. A method for lowering intraocular pressure comprising topically applying to the eye an effective amount for lowering such intraocular pressure of a 2-(trisubstituted phenylimino)-imidazoline, or a pharmaceutically acceptable salt thereof, having the formula



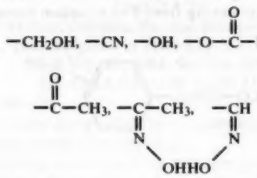
where $R_1$, $R_2$, $R_3$ and $R_4$ are defined in accordance with either I, II, or III as follows:

I. $R_1$=$R_2$=methyl, ethyl, trifluoromethyl, chloro or bromo.
$R_1 \neq R_2$ and each=methyl, ethyl, trifluoromethyl, fluoro, chloro and bromo,
one of $R_3$ and $R_4$ is H and the other is selected from



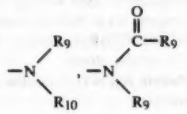
(a)

$R_5 \neq R_6$=H or lower alkyl,
$R_5$=$R_6$ and each=H, lower alkyl,
$R_7$=H, lower alkyl 2-hydroxyethyl, 2-hydroxypropyl or 3-hydroxypropyl,
the sum of the carbon atoms in $R_5$ and $R_6$ or $R_5$ and $R_7$ being 4 or less, or

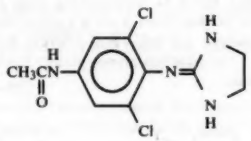


(b)

$R_8$=lower alkyl;
II. $R_1$=methyl, ethyl, trifluoromethyl, chloro or bromo,
$R_2$=H,
$R_3$=is selected from



$R_4$=methyl, chloro or bromo
$R_9$=H or lower alkyl,
$R_{10}$=H, lower alkyl, 2-hydroxymethyl, 2-hydroxypropyl or 3-hydroxypropyl,
the sum of the carbon atoms in $R_9$ and $R_{10}$ being 4 or less;
III. In no event shall said 2-(trisubstituted phenylimino)-imidazoline have the formula:



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**4,517,200**

## METHOD FOR TREATING ALLERGIC REACTIONS WITH FORSKOLIN

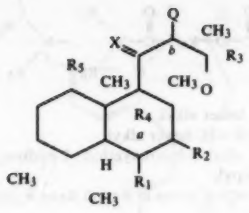
**William Kreutner, West Caldwell; Michael J. Green, Skillman; Ho-Jane Shue, Pine Brook, and Anil K. Saksena, Upper Montclair, all of N.J., assignors to Schering-Plough Corporation, Madison, N.J.**

**Continuation-in-part of Ser. No. 453,436, Dec. 27, 1982, abandoned. This application Oct. 17, 1983, Ser. No. 542,825**

**Int. Cl.³ A61K** *31/35;* **C07D** *311/02*

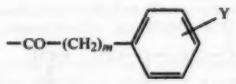
**U.S. Cl. 514—455** **10 Claims**

1. A compound having structural formula I:



I

wherein $R_1$ is hydrogen and $R_2$ is =O, H, or $OR_{11}$ wherein $R_{11}$ is H, alkanoyl having from 1 to 6 carbon atoms or



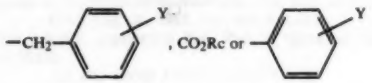
$-CO-(CH_2)_m$

wherein m is 0, 1, 2 or 3 and Y is hydrogen, halogen, alkyl having from 1 to 6 carbon atoms, alkoxy having from 1 to 6 carbon atoms, alkylthio having from 1 to 6 carbon atoms, OH, $CF_3$, $NO_2$, CN, phenyl, benzyl, phenoxy or $NR_aR_b$ wherein $R_a$ and $R_b$ are the same or different and are H or alkyl having from 1 to 6 carbon atoms; or $R_2$ may be $SO_3OR'$ or OR' wherein R' is alkyl having from 1 to 6 carbon atoms; $R_3$ is hydrogen; alkyl having from 1 to 10 carbon atoms; $CH_2OH$; CHO; $CO_2R_{15}$ wherein $R_{15}$ is H or alkyl having from 1 to 6 carbon atoms;

$-CH=CR_{16}R_{17}$ wherein $R_{16}$ is H, halogen, alkyl having from 1 to 6 carbon atoms,

CN,

wherein n is 0 or 1 and $R_c$ is H, alkyl having from 1 to 6 carbon atoms, phenyl or benzyl, $CHOHR_c$ or $C(OR_d)_2R_c$ wherein $R_c$ is defined above and $R_d$ is alkyl having from 1 to 6 carbon atoms, $R_{17}$ is H, alkyl having from 1 to 6 carbon atoms, alkoxy having from 1 to 6 carbon atoms, benzyl, phenyl or halogen; $-C\equiv C-R_{18}$ wherein $R_{18}$ is H, alkyl having from 1 to 12 carbon atoms, alkoxy having from 1 to 6 carbon atoms,

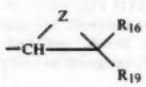


wherein Y and $R_c$ are defined above;

$-CHOH-C\equiv C-R_{19}$ wherein $R_{19}$ is H, alkyl of from 1 to 6 carbon atoms, phenyl or benzyl;

$-CH=C=CHR_{19}$ wherein $R_{19}$ is defined above;

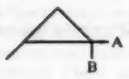
$=CH=N-OR_{19}$ wherein $R_{19}$ is defined above;



wherein

Z is O or S, and

$R_{16}$ and $R_{19}$ are defined above; $-CH(ZR_{20})_2$ wherein Z is defined above and $R_{20}$ is alkyl having from 1 to 6 carbon atoms, phenyl, benzyl or the two groups $R_{20}$ may together form $-(CH_2)p-$ wherein p is 2 or 3;



wherein

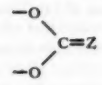
A and B are H, halogen, alkyl having from 1 to 6 carbon atoms, phenyl, benzyl or

wherein n and $R_c$ are defined above; $-CH=N-NDE$ wherein D and E are H, alkyl having from 1 to 6 carbon atoms, benzyl, phenyl, COG, $SO_2G$ or $CO_2G$ wherein G is alkyl having from 1 to 6 carbon atoms, benzyl or phenyl;

$R_4$ is H or OH;

$R_5$ is OH; or when

$R_4$ and $R_5$ are taken together they may form



wherein Z is defined above;

a is a 5,6 bond;

b is an optional bond, when present Q and $R_3$ are missing;

X is O or H/OR" wherein R" is H, alkanoyl having from 1 to 6 carbon atoms or trifluoroacetyl; and

Q is hydrogen, chlorine or bromine.

6. A pharmaceutical composition useful for treating allergic reactions in a mammal which comprises an antiallergic effective amount of a compound defined in claim 1, in combination with a pharmaceutically acceptable carrier.

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**4,517,201**

## SYNERGISTIC COMPOSITIONS AND METHODS OF COMBATING INSECTS EMPLOYING AMITRAZ AND CYPERMETHRIN

**John C. Kerry, Edwalton, and David M. Weighton, Saffron Walden, both of England, assignors to FBC Limited, Cambridge, England**

**Continuation-in-part of Ser. No. 305,211, Sep. 24, 1981, abandoned, which is a continuation-in-part of Ser. No. 172,392, Jul. 25, 1980, abandoned, which is a continuation of Ser. No. 920,155, Jun. 29, 1978, abandoned. This application Jul. 22, 1983, Ser. No. 516,455**

**Claims priority, application United Kingdom, Jul. 1, 1977, 27536/77**

**Int. Cl.³ A01N** *33/02, 37/34*

**U.S. Cl. 514—521** **7 Claims**

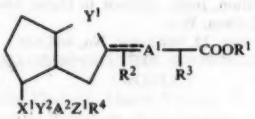
1. An insecticidal composition comprising amitraz and the synthetic pyrethroid cypermethrin in a ratio of from 100:1 to 4:1 by weight.

## 4,517,202
## PROSTAGLANDIN ANALOGUES

Clive W. Bird, Upminster; Helene I. Butler, Blandford; Michael P. L. Caton; Edward C. J. Coffee, both of Upminster; Geoffrey Darnbrough, Maldon, and Terance W. Hart, Brentwood, all of England, assignors to May & Baker Limited, Essex, England

Filed May 26, 1983, Ser. No. 498,315
Claims priority, application United Kingdom, May 28, 1982, 8215742
Int. Cl.³ C07C *177/00;* A61K *31/557*
U.S. Cl. 514—530 21 Claims

1. A prostaglandin analogue of the formula:



II

(wherein $R^1$ represents a hydrogen atom or a straight- or branched-chain alkyl group of 1 to 6 carbon atoms, $Y^1$ represents a carbonyl or hydroxymethylene group, ═══ represents a single or double bond, $A^1$ represents an alkylene linkage containing 2 or 3 carbon atoms and optionally bearing a methyl or ethyl substituent, $R^2$ represents a hydrogen atom or a methyl or ethyl group and $R^3$ represents a hydrogen atom or else $R^2$ and $R^3$ form an alkylene linkage containing 2 or 3 carbon atoms, optionally bearing a methyl or ethyl substituent, such that the symbols $A^1$, $R^2$ and $R^3$, together with the carbon atoms through which they are connected, form a cycloalkyl ring of 6, 7 or 8 carbon atoms, optionally bearing one or two methyl or ethyl substituents, $X^1$ represents an ethylene or trans-vinylene group, $Y^2$ represents a carbonyl or hydroxymethylene group, and either (i) $A^2$ represents a straight- or branched-alkylene chain containing from 1 to 3 carbon atoms, $Z^1$ represents a direct bond or an oxygen or sulphur atom, and $R^4$ represents a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms, optionally substituted by a cycloalkyl group containing from 3 to 8 carbon atoms, or represents a cycloalkyl group containing from 3 to 8 carbon atoms, or represents a phenyl group optionally substituted by a halogen atom or by a trifluoromethyl group or by a straight- or branched-chain alkyl or alkoxy group containing from 1 to 6 carbon atoms, or (ii) $A^2$ and $Z^1$ both represent direct bonds and $R^4$ represents a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms, optionally substituted by a cycloalkyl group containing from 3 to 8 carbon atoms, or represents a cycloalkyl group containing from 3 to 8 carbon atoms) or a cyclodextrin clathrate thereof or, when $R^1$ represents a hydrogen atom, a non-toxic salt thereof.

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## 4,517,203
## PROCESS FOR MAKING A FRIED FRUIT FILLING COMPOSITION-CONTAINING FOOD PRODUCT

Lawrence W. Levine, Teaneck, N.H., and Carolyn C. Mullins, Seattle, Wash., assignors to Carlin Foods Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 268,624, May 29, 1981, abandoned. This application May 6, 1983, Ser. No. 492,911
Int. Cl.³ A21D *13/08*
U.S. Cl. 426—19 13 Claims

1. A process for making a fried fruit filled, yeast dough product which comprises: forming a fruit filled, yeast dough product by enveloping a fruit filling in an envelope of a yeast dough which is capable of being cooked by frying, said fruit filling being impervious to contact with a frying medium under cooking conditions and having a soluble solids content of about 47% to about 51% by weight and about 12.2 to about 15.0% dehydrated fruit, at least a portion of which is evaporated apple, said yeast dough envelope having one or more perforations exposing said fruit filling, and immersing at least a portion of the fruit filling, yeast dough product in a frying medium under frying conditions for a time sufficient to allow the frying medium to fry said yeast dough envelope.

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## 4,517,204
## REDUCED CALORIE PUFFED SNACK FOOD PRODUCTS

George P. Mottur, Danville, Pa., and Richard W. Glass, College Station, Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed Feb. 27, 1984, Ser. No. 583,971
Int. Cl.³ A23L *1/18;* A21D *13/08*
U.S. Cl. 426—94 23 Claims

1. A process for producing a comestible reduced calorie puffed snack product comprising:

(a) introducing into a cooking extruder a mixture of a puff extrudable edible meal or flour, microcrystalline cellulose coated with from about 9% to about 15% by weight hydrophilic polysaccharide, and sufficient moisture to form a puff extrudable batter, wherein the ratio of edible meal or flour to hydrophilic polysaccharide coated microcrystalline cellulose is from about 9:1 to about 3:1 by weight;

(b) cooking said mixture in said cooking extruder under puff extrusion cooking conditions;

(c) extruding said mixture from said cooking extruder to form puffed collets; and

(d) drying said collets to reduce the moisture content of said collets to less than about 2% by weight.

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## 4,517,205
## CO-DEPOSITED TWO-COMPONENT HARD CANDY

Deborah G. Aldrich, Stamford, Conn., assignor to Nabisco Brands, Inc., Parsippany, N.J.

Filed Jan. 3, 1983, Ser. No. 455,162
Int. Cl.³ A23G *3/00, 3/20, 9/24*
U.S. Cl. 426—103 18 Claims

1. A codeposited two-component hard candy comprising:

50 to 95% by weight of a clear hard candy component shell portion and consisting essentially of a sweetener selected from the group consisting of sucrose, fructose, corn syrup, invert sugar and intensive sweeteners and combinations thereof, and, optionally, a flavoring ingredient and a coloring agent or dye, and

5 to 50% by weight of a fondant, liquid or viscous core portion completely encased in said shell portion, said core portion having a moisture content of no more than 20% by weight and comprising ingredients selected from the group consisting of glycerin, honey, sucrose, corn syrup, sugar alcohols, fructose, a heat stable active ingredient, flavoring and milk based products,

said core portion having color and light transmission characteristics different from those of said shell portion, and

wherein the difference between the specific gravity of said shell portion and the specific gravity of said core portion composition is not more than about 0.20 and the core portion comprises a core component with an overall boiling point which is not less than the boiling point of the hard candy component of the shell portion.

**4,517,206**

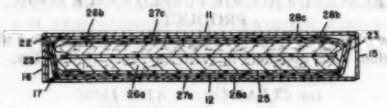
## FOOD PACKAGE AND STORAGE UNIT

**Gordon D. Murphy, Mahwah, N.J., and Ernest C. Bishop, St. John's, Canada, assignors to Fishery Products, Inc., Danvers, Mass.**

**Continuation of Ser. No. 378,219, May 14, 1982, abandoned, which is a continuation-in-part of Ser. No. 244,879, Mar. 18, 1981, abandoned, which is a continuation of Ser. No. 76,939, Sep. 19, 1979, abandoned. This application Nov. 7, 1983, Ser. No. 549,639**

**Int. Cl.³ B65D** *85/62, 57/00*

**U.S. Cl. 426—115** **1 Claim**



1. A frozen fish package and storage unit comprising:

(a) a hollow rectangular carton having a top wall, a bottom wall, two side walls, and two end walls, said carton forming an outer enclosure;

(b) a rectangular tray having a bottom wall, two relatively long side walls, two relatively short end walls, and an open top, said tray being correspondingly sized and shaped to slide into and out of said carton, said tray functioning as a frozen fish storage container separate and apart from said carton, said tray having a continuous rim formed at and running around the upper edges of said tray side walls and tray end walls, said tray having a plurality of spaced-apart flutes formed in said tray side walls and tray end walls, said rim and said flutes causing said tray to be substantially self-supporting;

(c) a first sheet of elongated, continuous, flexible, moisture-impervious, non-stick material having leading and trailing ends and two continuous surfaces, said first sheet trailing end being positioned adjacent one of said tray side walls, said first sheet extending across the width of said tray to a position adjacent the other of said side walls, one surface of said two continuous surfaces of said first sheet being above, downwardly facing, and parallel to the upper surface of said tray bottom wall, a first elongated single serving of frozen fish extending across the width of said first sheet in contact with the other upwardly facing surface of said two continuous surfaces of said first sheet, said first sheet being folded upwardly around and back over said first fish serving, said first sheet extending back across the width of said tray to a position adjacent said one of said tray side walls, said first sheet being wider than the length of said first fish serving thereby forming a food pocket containing said first fish serving, a second elongated single serving of frozen fish extending across the width of said first sheet in contact with said one surface of said first sheet, said second fish serving being spaced vertically apart and separated from said first fish serving by said interleaved first sheet, said first sheet being folded upwardly around and back over said second fish serving, said second sheet extending back across the width of said tray to a position adjacent said other of said tray side walls, said first sheet forming a food pocket containing said second fish serving, said first sheet being successively folded upwardly around and back over one or more additional similar elongated single servings of frozen fish thereby forming one or more additional vertically spaced-apart, open-ended, separated food pockets, each pocket containing a single fish serving, said pocket open ends facing said tray end walls, the longitudinal axes of said pockets being substantially perpendicular to said tray end walls, said first sheet leading end being positioned adjacent one of said tray side walls; and

(d) a second sheet of elongated, continuous, flexible, moisture-impervious, non-stick material, said second sheet extending lengthwise of said tray and perpendicular to said first sheet, said second sheet being entirely wrapped around and covering the open pocket ends of said folded first sheet, said second sheet forming a barrier against the entry of air and moisture into the open ends of said food pockets;

(e) said food pockets each containing a single serving of frozen fish in a separate substantially air barrier environment enhancing food freshness and ease of sequential removal of single fish servings from said tray.

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**4,517,207**

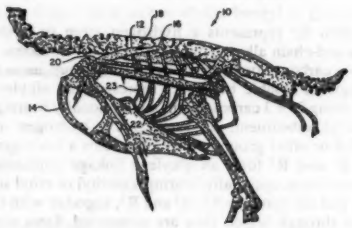
## METHOD FOR PROCESSING AN AVIAN CARCASS

**Jack L. Kress, Wilton, Iowa, assignor to Oscar Mayer Foods Corporation, Madison, Wis.**

**Filed Feb. 22, 1983, Ser. No. 468,535**

**Int. Cl.³ A22C** *21/00;* **A23B** *4/00;* **A23L** *1/315*

**U.S. Cl. 426—315** **19 Claims**



1. A method for processing an advancing avian carcass which comprises:

(a) removing warm muscle parts from an advancing avian carcass prior to rigor mortis on a continuous line wherein the avian carcass advances at a rate of at least ten carcasses per minute per line;

(b) eviscerating the advancing avian carcass by severing both of its scapula or their articulation, and separating the coracoids associated with the severed scapulas or their articulation from the vertebral column so that the entrails are exposed for inspection and wherein the evisceration occurs after warm parts have been removed from the advancing avian carcass; and

(c) initiating preservation of the removed warm muscle parts within two hours of removal.

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**4,517,208**

## COMPOSITION FOR TREATING FISH TO INCREASE FISH YIELD

**David L. Crawford, Astoria, Oreg., assignor to Benckiser-Knapsack GmbH, Ladenburg/Neckar, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 364,715, Apr. 2, 1982, Pat. No. 4,431,679. This application Jan. 13, 1984, Ser. No. 570,312**

**The portion of the term of this patent subsequent to Feb. 14, 2001, has been disclaimed.**

**Int. Cl.³ A23B** *4/02, 4/10*

**U.S. Cl. 426—332** **20 Claims**

1. A fish treatment composition which comprises:

(a) a phosphate mixture containing at least two of the following groups:

(i) up to about 95% of sodium pyrophosphate (-diphosphate), potassium pyrophosphate (-diphosphate), or a mixture thereof;

(ii) from about 14% to about 90% of sodium tripolyphosphate, potassium tripolyphosphate, or a mixture thereof;

(iii) from about 5% to about 50% of sodium hexametaphosphate, potassium hexametaphosphate or a mixture thereof, wherein said percentages are by weight based on the weight

of the phosphate mixture, and said phosphate mixture has a statistical average content by weight of $P_2O_5$ of about 47% to about 68%; and

(b) a preservative consisting of potassium sorbate, sorbic acid or a mixture thereof, in an amount by weight of about 0.1 to about 0.2 parts per part of said phosphate mixture; and,

(c) a sufficient amount of an acid component selected from the group consisting of one or more of malic, tartaric, and gluconic acids or the edible salts thereof, such that when said composition is present in a suitable liquid vehicle, a pH in the range of about 5.4 to about 6.7 is attained.

14. A method of treating fish comprising applying to the surface of said fish an effective amount of the composition of claim 1.

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## 4,517,209
## METHOD OF PREPARING A BISCUIT OR COOKIE PRODUCT

**Ian Thornton, Flackwell Heath; Kenneth W. DeWitt, Reading, and Simon A. Robertson, West Reading, all of England, assignors to Keebler Company, Elmhurst, Ill.**

**Filed Aug. 18, 1982, Ser. No. 409,115**
**Int. Cl.³ A21D *8/00***
**U.S. Cl. 426—383** **16 Claims**

1. A method of manufacture of a randomly fissured biscuit or cookie product, which comprises the steps of:

providing a predetermined quantity of an unbaked dough;

forming the quantity of the dough into a shaped unbaked dough piece having an upper surface which incorporates a network of impressed lines, a major proportion of the lines in the network being non-terminated and a minor proportion of the lines in the network being terminated at least at one location; and

baking the shaped dough piece under such baking conditions whereby its diameter increases and its upper surface includes random superficial fissures along at least some of the impressed lines of the network and also at least some of those areas of the upper surface of the unbaked dough piece which were not provided with any of the impressed lines of the network.

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## 4,517,210
## PROCESS FOR PREPARING A FRUIT AND CEREAL PRODUCT

**Harvey P. Fogel, Richland, Mich., assignor to General Foods Corporation, White Plains, N.Y.**

**Continuation of Ser. No. 293,070, Aug. 17, 1981, abandoned. This application Jun. 7, 1983, Ser. No. 500,803**
**Int. Cl.³ A23L *1/164*; A23B *7/00***
**U.S. Cl. 426—392** **12 Claims**

1. A process of preparing a breakfast food having discrete pieces of fruit blended with discrete pieces of cereal particles which comprises:

(a) preparing discrete bran cereal particles with a moisture of about 2.2%;

(b) hydrating said cereal particles with an amount of moisture effective to give said cereal particles:

(i) an $A_w$ of at least about 0.51 and a moisture content in excess of about 7.3%, and

(ii) a density between about 0.05 **and** 0.30 oz/in$^3$;

(c) preparing discrete fruit particles wherein said fruit particles are whole fruit units, fruit pieces, and combinations thereof having:

(i) an $A_w$ such that there is a ($A_w$ cereal particles-$A_w$ fruit particles) difference between about 0.20 and about 0.35,

(ii) a moisture content below 5%, and

(iii) a density between about 0.05 and about 0.30 oz/in$^3$;

(d) admixing the discrete cereal particles with the discrete fruit particles to form a ready-to-eat breakfast cereal, wherein said cereal particles comprise between about 65 and about 95% of said admixture;

(e) packaging said admixture in a container wherein said container is effective to minimize water vapor transfer between the product and the atmosphere; and

(f) transferring moisture from the cereal particles to the fruit particles by storing the cereal-fruit admixture for at least 7 days.

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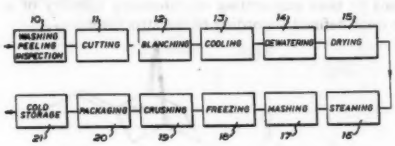
## 4,517,211
## METHOD FOR THE PRODUCTION OF CONCENTRATED, FROZEN POTATO PUREE

**Roland Haraldsson, Bromölla; Jan Bengtsson, Hässleholm, and Claes Friberg, Monopolvägen, all of Sweden, assignors to Fjalkinge Potato Processing Machinery AB, Hassleholm, Sweden**

**Filed Jan. 31, 1983, Ser. No. 462,193**
**Claims priority, application Sweden, Feb. 5, 1982, 8200664**
**Int. Cl.³ A23L *1/216***
**U.S. Cl. 426—444** **5 Claims**




1. A method for the production of concentrated, frozen potatoe puree from potatoes, the method comprising the sequential steps of: washing the potatoes; peeling the potatoes; cutting the potatoes into pieces; blanching the potatoes; cooling the potatoes; dewatering the potatoes; drying the potatoes to reduce the weight of the potatoes by approximately 40–60%; steaming the potatoes; mashing the potatoes; freezing the potatoes; and then crushing the potatoes;

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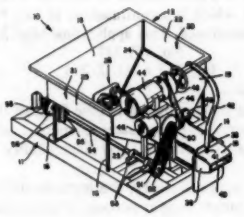
## 4,517,212
## METHOD OF DISPENSING DOUGH

**Sterrett P. Campbell, Norcross, Ga., assignor to AMF Incorporated, White Plains, N.Y.**

**Division of Ser. No. 257,261, Apr. 6, 1981, Pat. No. 4,449,908, which is a continuation-in-part of Ser. No. 58,120, Jul. 16, 1979, abandoned. This application Jan. 19, 1984, Ser. No. 571,999**
**Int. Cl.³ A21D *6/00***
**U.S. Cl. 426—496** **5 Claims**



1. A method of dispensing dough from the lower portion of a mass of dough comprising the steps of slicing dough from the lower portion of the mass of dough with a pair of interference helical screw elements each with a helical thread, with the thread of the first of said screw elements projecting into the spaces formed by the thread of the second of said screw elements, each thread of said screw elements including a conveying surface and an outer periphery, the conveying surfaces of the threads of the screw elements being concave and inclined at their peripheries toward a discharge conduit and intersecting the outer peripheries of the threads at a sharp acute angle to form a spiral cutting edge about each screw element; moving the dough with the conveying surfaces of the screw ele-

ments along a path and through a conduit; dividing the dough into batches as the dough is moved along the path; displacing each batch of dough through the conduit toward a discharge nozzle; and venting air from the dough as the dough approaches the discharge nozzle.

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**4,517,213**

## FLAVORING WITH NORBORNYL ESTERS

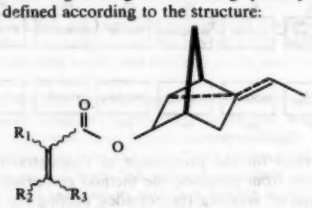
**Mark A. Sprecker, Sea Bright, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.**

**Division of Ser. No. 574,183, Jan. 26, 1984, , which is a division of Ser. No. 507,290, Jun. 23, 1983, Pat. No. 4,480,648, which is a division of Ser. No. 396,288, Jul. 8, 1982, Pat. No. 4,435,316. This application Aug. 24, 1984, Ser. No. 643,680**

**Int. Cl.³ A23L *1/226***

**U.S. Cl. 426—538** **8 Claims**

1. A process for augmenting or enhancing the aroma or taste of a foodstuff comprising the step of adding to said foodstuff an aroma or taste augmenting or enhancing quantity of at least one ester defined according to the structure:



wherein one of the dashed lines represents a carbon-carbon bond and the other of the dashed lines represents no bond; wherein the wavy lines represent a "cis" or a "trans" juxtaposition of the $R_1$, $R_2$, $R_3$ and carboalkoxy moieties around the carbon-carbon double bond; wherein $R_1$, $R_2$ and $R_3$ each represents methyl or hydrogen with the proviso that at least one of $R_1$, $R_2$ and $R_3$ is hydrogen.

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**4,517,214**

## SWEETENING COMPOSITION AND METHOD

**Myron D. Shoaf, and La Monte D. Pischke, both of Danbury, Conn., assignors to General Foods Corporation, White Plains, N.Y.**

**Continuation of Ser. No. 175,114, Aug. 4, 1980, abandoned, which is a continuation of Ser. No. 88,920, Oct. 29, 1979, abandoned, which is a continuation of Ser. No. 673,836, Apr. 5, 1976, abandoned, which is a continuation of Ser. No. 461,577, Apr. 17, 1974, abandoned. This application May 3, 1983, Ser. No. 491,237**

**Int. Cl.³ A23L *1/236***

**U.S. Cl. 426—548** **1 Claim**

1. A process for producing a flowable form of the dipeptide sweetener L-aspartyl-L-phenylalanine methyl ester, which form has a high rate of solubility and dispersibility, comprising the steps of:

(a) forming an aqueous slurry, the ingredients consisting of water and a minor weight percent of crystalline particles of L-aspartyl-L-phenylalanine methyl ester;

(b) maintaining said slurry at a temperature below 150° F. such that the vast majority of the crystalline material remains as undissolved particles and a minor amount of this material dissolves in the water with the resulting solution being distributed throughout the undissolved particles;

(c) hydro-milling the slurry to a particle size of less than 125 microns; and

(d) spray drying the milled slurry to produce a dry powder wherein subdivided discrete crystals of the dipeptide sweetener nest with one another and are permanently bound to one another at spaced points of contact by the dried solution.

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**4,517,215**

## PREPARATION OF VEGETABLE PASTAS

**Jau Y. Hsu, Brookfield, Conn., assignor to Nestec, S.A., Vevey, Switzerland**

**Filed May 26, 1983, Ser. No. 498,283**

**Int. Cl.³ A23L *1/16***

**U.S. Cl. 426—557** **6 Claims**

1. A process for the preparation of a vegetable pasta which comprises mixing a composition comprising a seed or tuberous vegetable in particulate form and, based on the total weight of the composition, from 0.1 to 4% by weight of sodium or potassium alginate or a mixture thereof, from 0.1 to 4% by weight of propylene glycol alginate and from 0 to 75% by weight of starch, said composition containing substantially no wheat flours, with an amount of water sufficient to moisten the composition and render it extrudable, extruding said mixture into a pasta shape, and finally drying the extruded mixture, with the proviso that at least 10% by weight of starch must be present when a high protein vegetable or potato powder is used.

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**4,517,216**

## GELLAN GUM/GELATIN BLENDS

**Jaewon L. Shim, San Diego, Calif., assignor to Merck & Co., Inc., Rahway, N.J.**

**Filed Mar. 5, 1984, Ser. No. 586,472**

**Int. Cl.³ A23L *1/04, 1/06***

**U.S. Cl. 426—573** **10 Claims**

1. A blend consisting essentially of gellan gum and gelatin wherein the wt:wt ratio ranges from 5:1 to 1:5.

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**4,517,217**

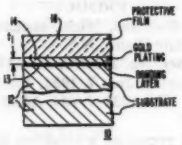
## PROTECTIVE COATING MEANS FOR ARTICLES SUCH AS GOLD-PLATED JEWELRY AND WRISTWATCH COMPONENTS

**Richard A. Hoffman, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 185,655, Sep. 9, 1980,. This application May 18, 1981, Ser. No. 264,322**

**Int. Cl.³ C23L *15/00***

**U.S. Cl. 428—632** **19 Claims**




1. In combination with an article of manufacture that is composed of metal and has a metallic surface which enhances the aesthetic appeal of the article but is susceptible to abrasion damage and/or environmental degradation such as corrosion and tarnishing, said article being of a type that is subjected to frequent human contact during normal usage of the article and is thus exposed to additional surface damage by such contact and usage,

an adherent coating that protects said article from such abrasion damage and degradation without materially altering the natural pleasing appearance of the metallic surface, said coating consisting essentially of a thin substantially transparent film of a sputter-deposited non-metallic inert material that has;

a Knoop hardness in the range of from about 400 to about 2500 and is thus of sufficient hardness to be abrasion-resistant, and

a refractive index in the range of from about 1.4 to about 2.8, said protective film having a thickness that is in the range of from about 14,000 to about 40,000 Angstroms and is also

so correlated relative to the refractive index of the nonmetallic inert material comprising said film that the film, in addition to being substantially transparent, is (a) substantially devoid of discoloration due to interference effects that otherwise would be produced by incident light rays and thus alter the natural aesthetic appearance of the underlying metallic surface of the article, and (b) is of sufficient thickness to protect the metallic surface of the article from abrasion damage and degradation when in use and subjected to frequent human contact.

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**4,517,218**

## PREPARATION OF IMITATION FOODS OF A TENDER TEXTURE FROM PROTEINACEOUS EXTRUDATES

**Walter C. Yackel, Jr., Oreana, and William E. Hebenstreit, Decatur, both of Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.**

**Continuation of Ser. No. 339,811, Jan. 15, 1982, abandoned. This application Sep. 21, 1983, Ser. No. 534,450**

**Int. Cl.³ A23J** *3/00*

**U.S. Cl. 426—656** **13 Claims**

1. A method for providing cooked food pieces having nonfibrous texture which simulate the tender and succulent textural properties of freshly cooked natural products; said method comprising preparing a homogeneous fluid molten mass from a mixture comprising a proteinaceous material and water, wherein said mixture contains for each 100 parts by weight proteinaceous material at least 110 parts by weight water, by subjecting said mixture, at superatmospheric pressure and at a temperature of from about 130° C. to about 160° C., to mechanical working, shearing and frictional forces which are sufficient to form said homogeneous fluid molten mass but which are insufficient to impart a tough fibrous meatlike character to the aforementioned cooked food pieces; moving the mass into a confined cooling zone; cooling the molten mass to a temperature below the normal boiling point of the water contained within the mass with the temperature and pressure of the confined cooling zone being maintained to prevent volatile constituents within said molten mass from forming voids within the cooled mass and to permit a continuous flow of the mass through the cooling zone; solidifying the cooled mass by extruding the cooled mass into a solidification zone maintained at a temperature below the solidification temperature of the cooled mass under soldifying conditions sufficient to provide an extrudate having a smooth surface and having a void volume of less than 0.1 void $cm^3/cm^3$ mass as determined upon an extrudate of a 6% by weight moisture content; piercing the solidified extrudate into the configuration of imitation food pieces; and impairing a tender texture to the imitation pieces by heating the pierced extrudate under superatmospheric pressure in the presence of a saline solution at a temperature greater than 95° C.

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**4,517,219**

## ELECTROSTATIC POWDER COATING CONTROL APPARATUS AND METHOD

**Bedrich Hajek, New Haven, Conn., assignor to Electrostatic Equipment Corp., New Haven, Conn.**

**Filed Oct. 20, 1983, Ser. No. 543,858**

**Int. Cl.³ B05D** *1/24*

**U.S. Cl. 427—8** **19 Claims**

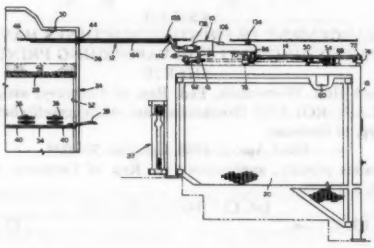
7. In a method for the electrostatic powder coating of a continuous length workpiece, wherein the build upon said workpiece is controlled, the steps comprising:

a. conveying a continuous length workpiece along a horizontal path proximate to an underlying electrostatic fluidized bed coating unit, to deposit thereupon electrostatically charged powder particles from a cloud thereof generated in said unit beneath said workpiece;

b. interposing between said workpiece and said cloud of particles an elongated rectilinear build control bar peripherally configured to define thereabout a plurality of longitudinally extending surface portions, and horizontally supported with a leading end portion thereof unsupported, said surface portions being different from one another in width dimensions and/or cross-sectional configuration;

c. selectively rotating said bar about its longitudinal axis to dispose, in an upward orientation directly under said workpiece, an appropriate one of said surface portions corresponding to the cross-sectional dimensions and configuration thereof; and

d. extending said bar as necessary to enable said leading end portion to effectively mask said workpiece from a portion



of said cloud, so as to thereby control the characteristics of the powder build produced thereupon.

8. The method of claim 7 wherein the extension of said bar is automatically adjusted to provide the desired build on said workpiece.

9. The method of claim 8 wherein said adjustment is made in response to a signal that is indicative of the characteristics of the build on said workpiece, and wherein said method includes steps for integrating said powder on said workpiece into a solidified coating, said signal being generated by means for sensing the nature of said coating upon said product.

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**4,517,220**

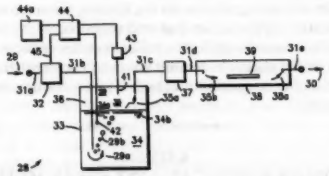
## DEPOSITION AND DIFFUSION SOURCE CONTROL MEANS AND METHOD

**John W. Rose, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 15, 1983, Ser. No. 523,214**

**Int. Cl.³ B05D** *5/12;* **C23C** *11/00, 13/00;* **H01L** *21/306*

**U.S. Cl. 427—8** **8 Claims**



1. A process for controlling the formation of a layer derived at least in part from a source material having at least one constituent of said layer, comprising:

providing a reaction vessel for forming said layer;

providing in series with said reaction vessel a region for containing said source material;

providing in series with said region containing said source material a variable flow means for a carrier gas, wherein said carrier gas is adapted to transport said source material, and wherein said variable flow means is adapted for varying the pressure of said carrier gas in said region;

providing means for sensing the temperature of said source material;

vaporizing a portion of said source material to provide

within said region containing said source material a partial pressure of said source material for mixing with said carrier gas;

flowing said carrier gas through said region containing said source material and into said reaction vessel; and

in response to variations in temperature of said source material, adjusting said variable flow means of said carrier gas to maintain a total pressure within said region containing said source material so that said partial pressure of said source material remains a predetermined fraction of said total pressure.

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**4,517,221**

## ARRANGEMENT IN PRINTING MACHINES HAVING A VARNISHING UNIT FOR VARNISHING PRINTED SHEETS

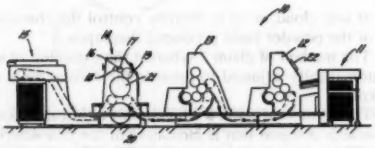
**Roland Holl, Weiterstadt, Fed. Rep. of Germany, assignor to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Apr. 2, 1984, Ser. No. 596,004**

**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1983, 3312128**

**Int. Cl.³ B41F *5/16, 5/18***

**U.S. Cl. 427—8** **12 Claims**



7. A control method for a varnishing system for a sheet-fed printing machine capable of continuous printing, said varnishing system having a supply of varnish, at least one varnish applicator roller cooperating with a cylinder, means for selectively transferring varnish from the supply of varnish to the varnish applicator roller, and means for feeding sheets to receive varnish from the varnish applicator roller, said control method comprising the steps of:

sensing a printing disturbance requiring continuous printing to be interrupted,

thereafter preventing the transfer of varnish from the supply of varnish to the varnish applicator roller,

thereafter waiting for at least one sheet to be fed to receive varnish from the varnish applicator roller, and

thereafter inhibiting the means for feeding sheets to the varnish application cylinder, so that said sheet receiving the varnish from the varnish applicator roller thereby reduces the likelihood of fed sheets becoming stuck to the varnish applicator roller or the cooperating cylinder when continuous printing resumes.

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**4,517,222**

## VAPOROUS AMINE CATALYST SPRAY METHOD OF APPLYING A FILM TO A SUBSTRATE

**James R. Blegen, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.**

**Continuation-in-part of Ser. No. 474,156, Mar. 10, 1983, abandoned. This application May 30, 1984, Ser. No. 615,135**

**Int. Cl.³ B05D *1/04, 1/06***

**U.S. Cl. 427—30** **35 Claims**

1. A method for applying onto a substrate a film of a coating composition in liquid form and which comprises a hydroxy-functional compound and a multiisocyanate cross-linking agent, wherein said applied film is curable rapidly at room temperature, which comprises:

(a) concurrently generating an atomizate of said coating composition and a carrier gas bearing a catalytic amount of a vaporous tertiary amine;

(b) mixing said atomizate and said vaporous catalytic amine-bearing carrier gas flow; and

(c) directing said mixture of step (b) onto said substrate to form said applied 10 film.

17. The method of claim 1 wherein said concurrent generation is conducted under electrostatic spray conditions.

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**4,517,223**

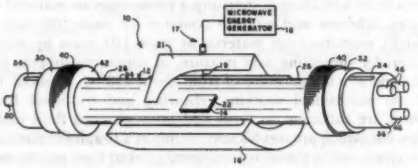
## METHOD OF MAKING AMORPHOUS SEMICONDUCTOR ALLOYS AND DEVICES USING MICROWAVE ENERGY

**Stanford R. Ovshinsky, Bloomfield Hills; David D. Allred, Troy; Lee Walter, Bloomfield Hills, and Stephen J. Hudgens, Southfield, all of Mich., assignors to Sovonics Solar Systems, Solon, Ohio**

**Filed Sep. 24, 1982, Ser. No. 423,424**

**Int. Cl.³ C23C *11/02***

**U.S. Cl. 427—39** **37 Claims**




1. A process for depositing amorphous semiconductor alloy films onto a substrate comprising:

providing a source of microwave energy;

coupling said microwave energy into a substantially enclosed reaction vessel containing said substrate;

maintaining the pressure within said vessel at about 0.2 Torr or less; and

introducing into said vessel reaction gases including at least one semiconductor containing compound to form a glow discharge plasma within said vessel and to deposit an amorphous semiconductor film from said reaction gases onto said substrate.

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**4,517,224**

## METHOD FOR REMOVING A PHOSPHOR LAYER FROM A SUPPORT SURFACE

**Lawrence H. Ditty, Clarks Summit, Pa., assignor to RCA Corporation, Princeton, N.J.**

**Filed Aug. 18, 1983, Ser. No. 524,156**

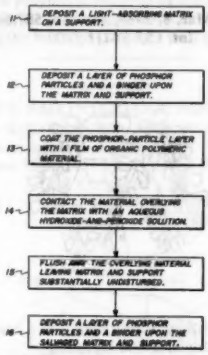
**Int. Cl.³ B32B *3/02***

**U.S. Cl. 427—64** **6 Claims**

1. In a method for preparing a luminescent viewing screen including depositing a layer of phosphor particles and a binder therefor upon a surface of a support and coating said phosphor layer with a film of organic polymeric material, the steps, before metallizing said film, for substantially entirely removing said phosphor layer and film comprising

(a) contacting said phosphor layer and film with an aqueous solution of ammonium hydroxide and hydrogen peroxide, said solution having a pH in the range of about 9 to 11,

until said film material and binder are at least partially solubilized


11
DEPOSIT A LIGHT-ABSORBING MATRIX ON A SUPPORT.
12
DEPOSIT A LAYER OF PHOSPHOR PARTICLES AND A BINDER UPON THE MATRIX AND SUPPORT.
13
COAT THE PHOSPHOR-PARTICLE LAYER WITH A FILM OF ORGANIC POLYMERIC MATERIAL.
14
CONTACT THE MATERIAL OVERLYING THE MATRIX WITH AN AQUEOUS HYDROGEN-AND-PEROXIDE SOLUTION.
15
FLUSH AWAY THE OVERLYING MATERIAL LEAVING MATRIX AND SUPPORT SUBSTANTIALLY UNDISTURBED.
16
DEPOSIT A LAYER OF PHOSPHOR PARTICLES AND A BINDER UPON THE SALVAGED MATRIX AND SUPPORT.

(b) and then flushing said surface with an aqueous medium until said film and phosphor layer are substantially entirely removed.

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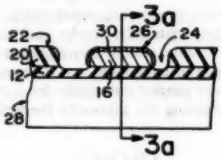
**4,517,225**

## METHOD FOR MANUFACTURING AN ELECTRICAL INTERCONNECTION BY SELECTIVE TUNGSTEN DEPOSITION

**Eliot K. Broadbent, San Jose, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.**

**Filed May 2, 1983, Ser. No. 490,381**
**Int. Cl.³ H01L** *21/285, 21/88*
**U.S. Cl. 427—89** **24 Claims**




1. A method of forming a structure for an electrical interconnection of an electrical device in which a first patterned electrically conductive layer is defined over a first electrically insulating layer, a second electrically insulating layer is formed over the first conductive layer and over adjacent material of the first insulating layer not underlying the first conductive layer, and an aperture is created through the second insulating layer to expose a surface portion of the first conductive layer, characterized by the steps of:

depositing tungsten on substantially all of the surface portion to form an intermediate electrically conductive layer whose thickness is proportionally much greater than the thickness of any tungsten then accruing on nearby material of the second insulating layer;

depositing a further electrically conductive layer on the intermediate conductive layer and over the remainder of the second insulating layer; and

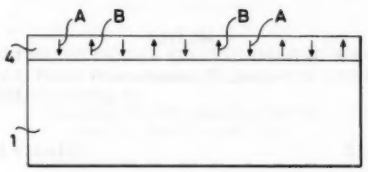
patterning the further conductive layer with etchant that does not significantly attack tungsten or the material of the second insulating layer to define a second patterned electrically conductive layer having a part in contact with at least a part of the intermediate conductive layer.

**4,517,226**

## METALLIZATION PROCESS OF A WAFER BACK

**Livio Baldi, Tortona, and Aldo Maggis, Vimercate, both of Italy, assignors to SGS-ATES Componenti Elettronici S.p.A., Catania, Italy**

**Filed Jun. 10, 1983, Ser. No. 503,255**
**Claims priority, application Italy, Jul. 29, 1982, 22627 A/82**
**Int. Cl.³ B05D** *5/12*
**U.S. Cl. 427—90** **6 Claims**




1. Metallization process of a silicon wafer back, comprising, in succession, the deposition of a first gold layer, the deposition of a second layer of aluminum and the thermic treatment by annealing to temperature lower than the eutectic gold-silicon temperature of the wafer with superimposed layers whereby the aluminum migrates through the gold layer toward the wafer.

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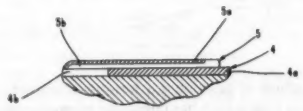
**4,517,227**

## FORMING OF THICK-LAYER, HYBRID ELECTRONIC PRINTED CIRCUITS

**Robert Cassat, Ternay, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France**

**Filed Nov. 12, 1982, Ser. No. 441,153**
**Claims priority, application France, Nov. 17, 1981, 81 21642**
**Int. Cl.³ B05D** *5/12*
**U.S. Cl. 427—96** **16 Claims**




1. In a process for forming a thick-layer hybrid electronic printed circuit, including printing predetermined circuit pattern onto an insulating substrate by deposition of predetermined ink pattern thereupon and thence baking said ink circuit pattern, and repeating said deposition/baking steps as required, the improvement which comprises employing an insulating ink comprising a non-conducting oxide derived from a non-noble metal which is either potentially conducting or potentially resistant, and then developing either the conductivity or resistivity of the said ink after it has been deposited and baked, by reducing same with a borohydride reducing agent adapted to readily and quantitatively convert said metal oxide into a conducting metal.

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**4,517,228**

## PIGMENTED PREPRESS COATINGS FOR COMPOSITION BOARD

**Robert C. Matejka, and Nellie M. Moretz, both of High Point, N.C., assignors to Reliance Universal, Inc., Louisville, Ky.**

**Filed Dec. 23, 1983, Ser. No. 564,732**
**Int. Cl.³ B05D** *1/18, 3/12;* **B32B** *3/26, 31/00*
**U.S. Cl. 427—370** **9 Claims**

1. In a process for manufacturing composition boards under heat and pressure comprising providing a composition board

stock, coating the surface of the stock, hot pressing the coated stock at elevated temperatures and pressure into a solid composition board product, and releasing the composition board product from the press, the improvement of which comprises utilizing as a composition board coating composition, an acrylic emulsion present at about the 2.5 to 58 percent by weight solids level, in combination with a platelet talc present at about the 25 to 97 percent by weight solids level, a crosslinking agent for the acrylic emulsion present at about the 0.3 to 18 percent by weight solids level, and a high melting wax present at about the 0.2 to 12 percent by weight solids level.

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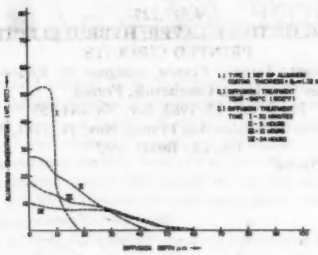
4,517,229

## DIFFUSION TREATED HOT-DIP ALUMINUM COATED STEEL AND METHOD OF TREATING

Richard A. Nickola, Highland, and Shashi B. Agarwal, Griffith, both of Ind., assignors to Inland Steel Company, Chicago, Ill.

Filed Jul. 7, 1983, Ser. No. 511,568
Int. Cl.[3] B05D *3/02*
U.S. Cl. 427—383.9 6 Claims



1. A method of providing a hot-dip aluminum coated low carbon steel strip which has improved room temperature formability and good high temperature oxidation resistance after being severely deformed at room temperature comprising;

(a) applying on a continuous hot-dip coating line a hot-dip aluminum coating having a thickness range between about 8 μm (0.31 mil) and 37 μm (1.5 mil) selected from the group consisting of aluminum and aluminum-silicon alloy containing up to about 12 wt. percent silicon to a clean surface of a low-titanium alloy low carbon steel strip; and

(b) heating said strip having said hot-dip aluminum coating in a diffusion heating zone containing a non-oxidizing atmosphere at a temperature of about 1500° F. and for a period of between 24–50 hours which avoids significantly increasing the grain size of the hot-dip coated steel strip and transforms the said hot-dip aluminum coating into a surface coating of solid solution diffusion alloy selected from the group consisting of iron-aluminum diffusion alloy and iron-aluminum-silicon diffusion alloy containing up to about 12 wt. percent silicon with a surface concentration between about 8 and about 10 wt. percent aluminum, and

(c) said diffusion alloy coated steel strip characterized by having good resistance to oxidation at a temperature between 704° C. (1300° F.) and 982° C. (1800° F.) after being subjected to severe deformation at room temperature.

4,517,230

## ARTIFICIAL CAMOUFLAGE LEAF CONSTRUCTION

Tad E. Crawford, 6645 Cleveland Ave. S., East Sparta, Ohio 44626

Filed Mar. 8, 1984, Ser. No. 587,600
Int. Cl.[3] F41H *3/00*
U.S. Cl. 428—17 6 Claims

1. Artificial camouflage for attaching to a hunter's clothing or equipment, said construction including:

(a) a first elongated piece of separable fabric fastening material adapted to be permanently secured to the hunter's clothing or equipment, said first piece of material having a looped pile covering on an exposed surface thereof when said fastening material is attached to the clothing or equipment;

(b) a second elongated piece of separable fabric fastening material for removable attachment to said first piece of fastening material, said second piece of fabric fastening material having a hooked covering on one side thereof for removable attachment with the looped pile covering of said first fastening material;

(c) a plurality of pieces of fabric shaped to simulate a plurality of leaves;

(d) a stem formed of a nylon monofilament strand secured to each of the fabric leaves and extending generally throughout the length of each leaf, said stems being flexible with sufficient memory to retain a shape imparted thereto; and

(e) attachment means for securing the respective fabric leaves and stems in a spaced relationship on the second piece of fastening material whereby said fabric leaves and stems are removably attached in elongated strips to the hunter's clothing or equipment and the stems bent so that the fabric leaves project outwardly from the clothing or equipment disrupting the silhouette thereof.

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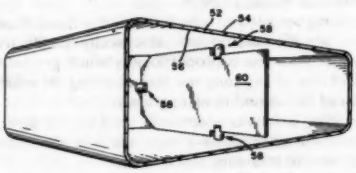
4,517,231

## HOLLOW ENCLOSED SEAMLESS POLYMERIC ARTICLE CONTAINING A BAFFLE

Joseph R. May, Chatham; Frank Petruccelli, Parsippany-Troy Hills; Robert L. Lang, Florham Park, and Herman P. de Haan, Chatham, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 13, 1982, Ser. No. 416,797
Int. Cl.[3] B32B *1/02, 27/00*
U.S. Cl. 428—35 11 Claims



1. A hollow, enclosed, seamless polymeric article comprising:

an outer wall having an outside surface and an inside surface;

at least one baffle; and

a rod containing a longitudinal slot to receive the baffle, wherein the rod is made of a polymeric material compatible with the polymeric material of the outer wall, the rod being connected to the inner surface of the outer wall and connecting the baffle to the outer wall inside of the article.

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**4,517,232**

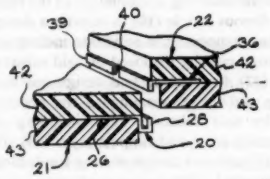
**TABLE PAD INTERLOCK ASSEMBLY**

**Christopher P. Krauser, Toledo, Ohio, assignor to The Ohio Table Pad Company, Toledo, Ohio**

**Filed Mar. 26, 1984, Ser. No. 593,517**

**Int. Cl.³ B32B** *3/06*

**U.S. Cl. 428—57** **18 Claims**




1. A table pad interlock assembly comprising, in combination, a first member including a first base and a channel extending along one side of said first base, a second member including a second base and a depending flange extending along one side and perpendicular to said second base, said channel of said first base receiving said flange when said assembly is in a locked position, said first and second members being restrained from movement transverse to the direction of the channel and means for preventing movement of said first and second members longitudinally in the direction of the channel when said assembly is in such locked position.

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**4,517,233**

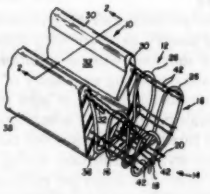
**TWO-WIRE CARRIER EDGE PROTECTOR TRIM STRIP**

**Edward C. Welchman, Rock Hill, S.C., assignor to Schlegel Corporation, Rochester, N.Y.**

**Filed Mar. 16, 1984, Ser. No. 590,192**

**Int. Cl.³ E06B** *7/22;* **E04F** *19/02*

**U.S. Cl. 428—108** **5 Claims**



1. A longitudinally extending two-wire carrier adapted to be formed into a U-shape including two relatively straight side portions and a base portion for use in an edge protector trim strip comprising:

a continuous metallic serpentine support wire having oppositely facing first bights joined by first lengths of said wire extending transversely and spaced from one another longitudinally of said carrier, said oppositely facing first bights being spaced from one another a predetermined distance between parallel lines tangent to said first bights for defining the width of said support wire;

a continuous metallic serpentine reinforcing wire having oppositely facing second bights joined by second lengths of wire extending transversely and spaced from one another longitudinally of said carrier, said oppositely facing second bights being spaced from one another a finite distance substantially less than said predetermined distance between parallel lines tangent to said second bights for defining the width of said reinforcing wire, the entire width of said reinforcing wire being selectively arranged in juxtaposed relation with no more than a portion of said support wire; and

a plurality of strands of material extending longitudinally of said carrier and interwoven with said support and reinforcing wires to maintain the spaced relation of said first and second wire lengths thereof.

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**4,517,234**

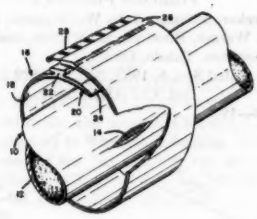
**HEAT RECOVERABLE SLEEVE FORMING WRAP**

**Howard Z. Fisher, Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed May 18, 1981, Ser. No. 264,739**

**Int. Cl.³ H02G** *15/18, 3/04*

**U.S. Cl. 428—119** **3 Claims**



1. A heat recoverable, sleeve forming wrap, comprising,

a. a length of cross-linked, expanded, heat recoverable material having first and second ends with the second end being thicker than the first end to provide an outwardly facing surface;

b. An elongated upright rib positioned adjacent the first end and having on a side facing away from the first end, a downwardly facing shoulder and on the opposite side a vertical surface of about the same thickness as the outwardly facing surface on the second end;

c. an elongated clasp having projecting C-shaped means along one side, said clasp being attached to the second end of the material with the C-shaped means extending outwardly over the outwardly facing surface so that upon forming the wrap into a sleeve, the two ends thereof may be fastened together by latching the C-shaped means in under the downwardly facing shoulder on the one side of the rib and removably locking the C-shaped means by abutting the outwardly facing surface against the vertical surface on the opposite side of the rib.

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**4,517,235**

**TRANSFER COATING OF ABRASION-RESISTANT LAYERS**

**Israel S. Ungar; Herbert I. Scher, both of Randallstown, and Nelson L. O'Neill, Crofton, all of Md., assignors to Nevamar Corporation, Odenton, Md.**

**Filed Nov. 16, 1982, Ser. No. 442,070**

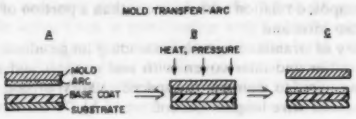
**Int. Cl.³ D06N** *7/04;* **B41C** *1/06;* **B32C** *3/00*

**U.S. Cl. 428—148** **29 Claims**

1. A process for providing an abrasion-resistant deposit on the surface of a substrate having a flowable surface, comprising providing a transfer carrier having a dried ultra-thin deposit or coating consisting essentially of a non-resinous binder material and mineral abrasive particles, which ultra-thin deposit has been dried at a temperature of at least 140° F., and transferring said ultra-thin deposit from said carrier into the flowable surface of said substrate under conditions of heat and pressure

whereby said deposit becomes combined with the surface of said substrate, and removing said carrier.

8. A process according to claim 1 wherein said surface of said substrate is a thermosettable material or a thermoplastic.




19. A product obtained by the process of claim 8, with the proviso that said product is not a decorative laminate.

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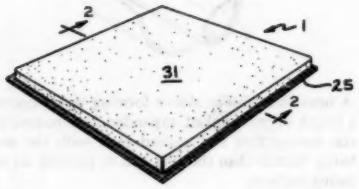
**4,517,236**

## FIBROUS PRODUCT

**Brian L. Meeker, Maumee; John W. Ferguson, Perrysburg, and Henry G. Werner, Rossford, all of Ohio, assignors to Fiber-Lite Corporation, Toledo, Ohio**

**Filed Sep. 6, 1983, Ser. No. 529,229**
**Int. Cl.³ B32B *23/02***
**U.S. Cl. 428—192** **29 Claims**




1. A ceiling tile for suspension in a grid-type support structure comprising:

a first layer of high density substantially rigid fibrous material, said first layer having a first surface and a second surface, said first layer defining an edge around the outer periphery of said first and second surfaces;

a second layer of fibrous material positioned adjacent said second surface of said first layer, said second layer being substantially the same size and shape as said first layer, said second layer being substantially in alignment with said first layer, said second layer being at least twice as thick as said first layer and said second layer having less than ½ of the density and rigidity of said first layer, an edge being defined around the outer periphery of said second layer, said edge of said second layer being substantially in alignment with said edge of said first layer; and,

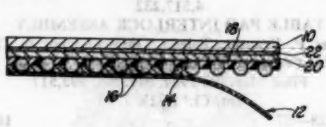
a projection extending from said edge of said second layer, said projection being spaced apart from said first layer, said projection extending around the entire outer periphery of said second layer, said projection being disposed for engaging said support grids, said projection formed from said fibrous material of said second layer, said projection extending from substantially the mid point of said edge of said second layer, a portion of said second layer extending from said projection in a direction away from said first layer, said projection having a thickness that is substantially the same as the thickness of said first layer caused by compressing said second layer in the region of said projection, thereby giving said projection a density and rigidity substantially the same as the density and rigidity of said first layer.

**4,517,237**

## TRANSFER INCLUDING SUBSTRATE WITH DEFORMABLE THERMOPLASTIC COAT

**Vincent S. Pernicano, 2833 Railroad St., Boyne Falls, Mich. 49713**

**Filed Sep. 30, 1982, Ser. No. 431,226**
**Int. Cl.³ B32B *27/14***
**U.S. Cl. 428—198** **21 Claims**




1. A heat transfer sheeting combination of the type for being applied onto a fibrous article (10) to imprint a design thereon, said combination comprising: a substrate including a support layer (24); a design coating disposed on said substrate (12); an adhesive layer (22) disposed on said design coating for adhesively securing said design coating to the article (10); and characterized by said substrate (12) including deformable means (28) disposed over said support layer (24) and between said substrate (12) and said design coating for deforming about the fibers of the article (10) during application of said design coating to form a reversible mechanical bond with the article (10).

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**4,517,238**

## METHOD OF MAKING INTEGRAL MOLDED SILICONE PRODUCTS WITH DIFFERENT PHASES AND THE MOLDED PRODUCTS PREPARED THEREFROM

**Katsutoshi Mine; Toshio Suzuki, and Tsuneo Hanada, all of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan**

**Filed Mar. 21, 1983, Ser. No. 477,206**
**Claims priority, application Japan, Mar. 25, 1982, 57-47644**
**Int. Cl.³ B05D *3/02*; B32B *7/02***
**U.S. Cl. 428—212** **14 Claims**

1. A method for producing an integral silicone molded product comprising a unitary structure with different phases comprising coating a substrate with an addition-reaction curable polyorganosiloxane consisting essentially of

(i) a polyorganosiloxane having at least two silicon-bonded alkenyl radicals per molecule where said alkenyl radicals have two to three carbon atoms per radical,

(ii) a polyorganohydrogensiloxane having at least two silicon-bonded hydrogen atoms per molecule where the sum of the number of alkenyl radicals per molecule in component (i) and the number of silicon-bonded hydrogen atoms per molecule in component (ii) is at least 5, and

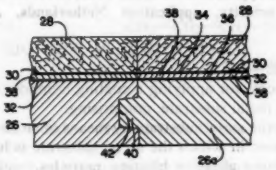
(iii) an addition-reaction catalyst,

where at least one of components (i), (ii), and (iii) is applied onto the substrate and a composition which necessarily contains the remainder of component (i), (ii), and (iii) but does not simultaneously contain all of components (i), (ii), and (iii) is then applied and diffuses with the result that the addition-reaction curable polyorganosiloxane composition coating is composed of a polyorganosiloxane phase whose degree of crosslinking is relatively low and a polyorganosiloxane phase whose degree of crosslinking is relatively high and the phase whose degree of crosslinking is relatively low is formed next to the substrate.

## 4,517,239
## FIBER-CEMENT/PLYWOOD WALKING SURFACE

Thomas L. Thompson, Costa Mesa, Calif., assignor to Thom-McI, Inc., Balboa, Calif.

Filed Nov. 26, 1982, Ser. No. 444,802
Int. Cl.³ B32B 3/26
U.S. Cl. 428—307.3 3 Claims




1. A flooring structure for walkways and the like, comprising:

a first panel member formed from a sheet of plywood having a predetermined size and configuration, said first panel defining a substructure;

a second panel member consisting essentially of cement; crushed limestone, volcanic ash and asbestos fibers, and having a predetermined size and configuration so as to be affixed to said first panel on one surface thereof, said second panel defining the walking surface of said flooring structure;

means for securing said first panel to said second panel, whereby said flooring structure is formed;

said securing means comprising:

a first bonding layer of catalized resin material coated on the top surface of said sheet of plywood;

a second bonding layer of catalized resin material coated on the underside of said sheet of fiber cement; and

a third intermediate layer of a catalized resin material interposed between said first and second bonding layers,

said third intermedite layer comprising a catalized polyester resin mixed with a thickening agent.

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## 4,517,240
## PROCESS FOR PREPARING FIBERBOARD

Arthur A. Tracton, Somerville, N.J., and John N. Guidice, Charlotte, N.C., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 350,947, Feb. 22, 1982, abandoned. This application Oct. 3, 1984, Ser. No. 657,286
Int. Cl.³ B32B 23/00; B05D 3/02
U.S. Cl. 428—326 20 Claims

1. A one-step process for simultaneously compressing and tempering a fiberboard panel, which comprises the step of applying to the panel prior to compression thereof an aqueous treating composition which comprises about 3–20% by weight of an acrylic or vinyl acetate emulsion or solution polymer and about 0.05–3.0% by weight of a fluid, water-soluble organosilicone copolymer of dimethylpolysiloxane-polyoxyalkylene ether wherein the alkylene moiety is ethylene or propylene or mixtures thereof, characterized in that the treating composition acts both as a platen release agent during compression and as a tempering agent for imparting water-resistance.

19. The fiberboard produced by the process of claim 1.

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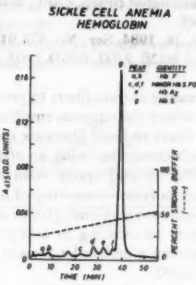
## 4,517,241
## CHROMATOGRAPHIC SUPPORT MATERIAL

Andrew J. Alpert, 4417 Darsey, Bellaire, Tex. 77401

Filed Dec. 2, 1982, Ser. No. 446,391
Int. Cl.³ B01D 15/08; B05D 3/14; G01H 31/08
U.S. Cl. 428—332 43 Claims

1. A coated support material comprising a chromatographically suitable substrate; and an uniform immobilized coating, susceptible to derivatization to a form suitable for protein




chromatography, on said substrate formed by the reaction of a polymer containing succinimide units with said substrate.

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## 4,517,242
## PROTECTIVE COATING FOR DRY HEAT STERILIZABLE GLASSWARE

Kamal R. Sinha, Millville, and Brian E. Caldwell, Laurel Lake, both of N.J., assignors to Wheaton Industries, Millville, N.J.

Continuation-in-part of Ser. No. 486,104, Apr. 18, 1983,. This application Jun. 6, 1983, Ser. No. 501,506
Int. Cl.³ B32B 17/10, 27/28
U.S. Cl. 428—336 10 Claims

1. A glass product having a continuous hydrophilic, water removable, abrasion-resistant, protective coating thereon, said coating consisting essentially of from 20% to 95%, by weight, of a styrene-maleic anhydride copolymer and from 5% to 80%, by weight, of a lubricious inclusion whereby said glass product may be sterilized at temperatures above 400° F. without dischlorization.

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## 4,517,243
## GLASS COATING COMPOSITION AND METHOD

Kamal R. Sinha, Millville, and Brian E. Caldwell, Laurel Lake, both of N.J., assignors to Wheaton Industries, Millville, N.J.

Filed Apr. 18, 1983, Ser. No. 486,104
Int. Cl.³ B32B 17/10, 27/28
U.S. Cl. 428—336 8 Claims

1. A glass product having a continuous hydrophilic, water insoluble, abrasion-resistant, protective coating thereon, said coating consisting essentially of from 20% to 95%, by weight, of a cross-linked styrene-maleic anhydride copolymer and from 5% to 80%, by weight, of a lubricious inclusion.

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## 4,517,244
## RECORDING MEDIUM AND INK JET RECORDING PAPER

Masatsune Kobayashi, Yokohama; Masahiro Haruta, Funabashi; Tsuyoshi Eida, Ichikawa, and Tokuya Ohta, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 29, 1982, Ser. No. 403,013
Claims priority, application Japan, Aug. 6, 1981, 56-123320; Aug. 6, 1981, 56-123321
Int. Cl.³ B41M 5/00; G01D 15/34; D21H 1/38; B32B 27/10
U.S. Cl. 428—342 15 Claims

1. A recording medium comprising a substrate material including a highly water-absorptive resin having a water-absorbing capacity of 50 to 1000 times its own weight.

4,517,245

## NON-IONIC EPOXY RESIN EMULSION FINISHES FOR CARBON FIBERS

Raymond G. Spain, Huntington Beach, Calif., assignor to Hitco, Newport Beach, Calif.

Filed Jan. 26, 1984, Ser. No. 574,016
Int. Cl.³ B32B 9/00; B05D 3/02
U.S. Cl. 428—367 14 Claims

1. In a method of treating carbon fibers to provide an epoxy resin finish thereon in which the aqueous emulsion of an epoxy resin is applied to said fibers and said fibers are thereafter dried, the improvement which comprises using an effective amount of a non-ionic emulsifier in said epoxy resin emulsion, said emulsifier being a block polymer consisting of a poly(oxypropylene) chain having poly(oxyethylene) groups at both ends of said chain, said polymer terminating in a primary hydroxyl group, said polymer having a molecular weight ranging from about 1100 to about 14,000.

8. Carbon fibers having a uniform coating of epoxy resin thereon obtained by the process of claim 1.

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4,517,246

## PARTICULATE POLYOLEFIN MOLDING MATERIAL

Kiyoshi Matsuyama; Kenji Ochi; Hiroyuki Ogawa, all of Ehime; Takuya Suzaki, and Kazuyoshi Imai, both of Shizuoka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 29, 1982, Ser. No. 437,597
Int. Cl.³ B32B 5/16, 9/00; B05D 1/02
U.S. Cl. 428—407 10 Claims

1. A particulate polyolefin molding material, comprising a particulate polyolefin particle having a bulk density of 0.45 g/cc or more and a mean particle size of 150 to 2,000μ, and having a coating of at least one layer comprising at least one compounding additive and an organic binder formed on the surface of said particle.

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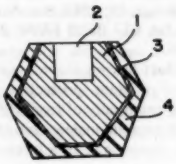
4,517,247

## FLUORORESIN FORMED BODY AND METHOD FOR PRODUCING THE SAME

Hirosuke Suzuki, Tokorozawa, and Yoshiaki Sato, Hitaka, both of Japan, assignors to Junkosha Co., Ltd., Tokyo, Japan

Filed Apr. 11, 1983, Ser. No. 483,685
Claims priority, application Japan, May 21, 1982, 57-86762
Int. Cl.³ B32B 27/30, 1/10
U.S. Cl. 428—421 6 Claims




1. A method for producing a fluoropolymer-coated shaped article comprising:

heating a heat-conductive mold having a thin layer of a fluoropolymer resin thereon to a temperature above the melting point of said resin to form a thin fluoropolymer weld layer on said mold;

treating the external surface of said weld layer to enhance its bondabiity to form-maintaining synthetic resins;

forming a form-maintaining synthetic resin integrally on the treated surface of said fluoropolymer weld layer; and

removing said heat-conductive mold.

6. A shaped article comprising a synthetic resinous body and a thin fluoropolymer weld layer formed on the surface of said synthetic resinous body, wherein said thin fluoropolymer weld layer is formed from a powder of fluoropolymer.

4,517,248

## PROCESS FOR APPLYING A COATING COMPOSITION TO A SUBSTRATE, AND THE COATED SUBSTRATE THUS OBTAINED

Leendert A. Kik, Wassenaar, and Pieter H. J. Schuurink, Noordwijk-binnen, both of Netherlands, assignors to Akzo nv, Arnhem, Netherlands

Continuation of Ser. No. 393,878, Jun. 30, 1982, abandoned.
This application Dec. 29, 1983, Ser. No. 566,960
Claims priority, application Netherlands, Jul. 2, 1981, 8103172
Int. Cl.³ B32B 15/04; B05D 1/02
U.S. Cl. 428—457 10 Claims

1. A process for applying a coating composition to an iron-containing metal substrate, comprising:

cleaning the metal substrate by means of an abrasive blasting treatment in which the metal substrate is hit by a stream containing abrasive blasting particles, said stream comprising a stream of gas emanating from a blast nozzle at a pressure in the range of 2 to 10 bar and at a feed rate of 0.1 to 12 $m^3$/min; and

applying a coating composition comprising a film-forming binder to the metal substrate by means of a coating treatment in which the metal substrate is hit with a stream of the film-forming binder simultaneously with the abrasive blasting treatment, said film-forming binder being selected from the group consisting of thermohardening, thermoplastic and elastomeric film-forming binders.

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4,517,249

## SUPER JET BLACK COATINGS

Sol Panush, Farmington Hills, Mich., assignor to Inmont Corporation, Clifton, N.J.

Division of Ser. No. 535,020, Sep. 23, 1983, Pat. No. 4,487,869.
This application Jun. 4, 1984, Ser. No. 617,206
Int. Cl.³ B32B 15/08, 27/00
U.S. Cl. 428—463 10 Claims

1. A substrate material coated with a super jet black coating composition comprising a polymer component containing at least about 25% by weight of a thermosetting resin and a pigment component containing at least about 5% by weight of a 1:2 chromium complex of a mono-AZO dye substituted with amino-phenol and coupled with 2-napthol and, as the outer most layer, a transparent topcoat comprising a thermoplastic or thermosetting resin layer.

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4,517,250

## EMULSION TYPE ADHESIVE COMPOSITIONS

Pawan K. Agarwal, Westfield; Robert D. Lundberg, Bridgewater; Joseph Wagensomer, Westfield, all of N.J., and Frank C. Jagisch, Baton Rouge, La., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

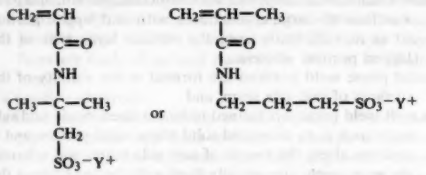
Filed Mar. 26, 1984, Ser. No. 593,564
Int. Cl.³ C08L 57/02
U.S. Cl. 428—483 10 Claims

1. A water based emulsion pressure sensitive adhesive composition derived from a composition which comprises a mixture of:

(a) an emulsion of a metal neutralized sulfonated elastomeric copolymer, said neutralized sulfonated copolymer having about 5 to about 250 meq. of neutralized sulfonated groups per 100 grams of said metal neutralized sulfonated copolymer; and

(b) about 25 to about 200 parts by weight of a hydrocarbon tackifying resin based on a petroleum or coal tar distillate per 100 parts by weight of said metal neutralized sulfonated elastomeric copolymer, wherein said emulsion of metal neutralized sulfonated elastomeric copolymer comprises at least 80% by weight of at least one conjugated diene having from 4 to 12 carbon atoms or a combination of at least 80% by weight of at least one conjugated diene and styrene, wherein the combination contains less than 50

weight percent styrene of the total 80 weight percent and a minor proportion of a metal or amine neutralized sulfonate monomer characterized by the formula:



wherein $Y^+$ is a cation selected from Groups IA, IIA, IB, and IIB of the Periodic Table;

said copolymer being water insoluble, substantially gel-free, thermally stable and oxidatively stable having at least 0.5 weight percent chemically combined to less than 5 weight percent chemical combined sulfur, with a reduced viscosity as measured in a solvent at a concentration of 10 gm/liter of greater than 0.2 and less than 5.0.

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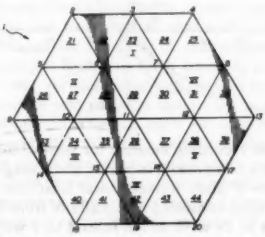
**4,517,251**

## BLANK FOR FOLDING AN OCTAHEDRON AND FOLDED PRODUCT

**Jeannine Mosely, 48 Teel St., Arlington, Mass. 02174**

**Filed Sep. 30, 1982, Ser. No. 430,974**
**Int. Cl.³ A47G *33/08*; G09F *1/00***
**U.S. Cl. 428—542.8** **7 Claims**



1. A blank of foldable sheet material for folding a regular octahedron comprising

a sheet of foldable material having the shape of a regular hexagon, without interior cuts or exterior tabs

scored or marked for scoring along lines subdividing said hexagon into exactly 24 areas of equal size and shape comprising 24 equilateral triangles of equal size, each having sides one half the length of a side of said hexagon.

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**4,517,252**

## PRE-ALLOYED THICK FILM CONDUCTOR FOR USE WITH ALUMINUM WIRE BONDING AND METHOD OF BONDING

**Steven C. Hugh, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed May 6, 1983, Ser. No. 492,512**
**Int. Cl.³ H01B *1/02*; B22F *7/04*; B32B *15/02***
**U.S. Cl. 428—553** **15 Claims**

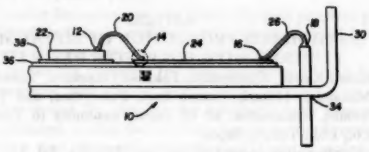
1. A thick film composition essentially free of glass frit or fluxing agents, said composition comprising metal particles containing gold prealloyed with at least one additional element, the gold and said at least one additional element being uniformly dispersed through the material and prealloyed in ratios effective to impede the growth of intermetallic compounds at any metallic bonds on said material, said composition bonded to Al wire.

9. A method of forming a thick film conductor essentially free of glass frit or fluxing agents comprising:

prealloying particles comprising Au with at least one additional element in ratios effective to impede intermetallic compound growth;

preparing an ink from the prealloyed particles;

screening the ink onto a vitreous dielectric;



firing the ink on the dielectric at a temperature of between about 750° C. and 1000° C. to form a thick film conductor; and

bonding the thick film conductor to Al wire to provide a high strength, low resistance bond which is resistant to the formation of intermetallic compounds throughout the conductor.

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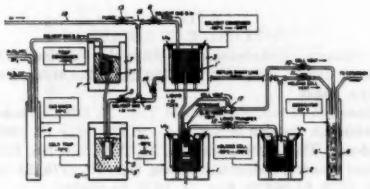
**4,517,253**

## CRYOELECTRODEPOSITION

**Robert M. Rose, 18 Morgan St., Wenham, Mass. 01984, and Donald R. Sadoway, 53 Vernon Rd., Belmont, Mass. 02178**

**Filed Jan. 23, 1984, Ser. No. 572,822**
**Int. Cl.³ C25B *1/00***
**U.S. Cl. 428—620** **51 Claims**



1. A method of electrodeposition of a reactive metal, an elemental semiconductor, a noble or precious metal and compounds and alloys thereof onto a subtrate, that comprises:

establishing an anhydrous ion solution of the material to be deposited in a liquid electrolyte consisting of a mixture taken from the group consisting of liquid halides and halogens having an appropriate electrical conductance and said material;

immersing electrodes in the ion solution; and establishing an electrical potential between the electrodes to attract material ions in the solution to one of the electrodes which serves as a substrate for deposition.

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**4,517,254**

## ADHESIVE METALLIZATION OF POLYIMIDE

**Joachim Grapentin; Hartmut Mahlkow, and Jürgen Skupsch, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

**Filed Dec. 13, 1982, Ser. No. 449,492**
**Claims priority, application Fed. Rep. of Germany, Dec. 11, 1981, 3149919**
**Int. Cl.³ B32B *15/08*; B05D *3/10*; C25D *5/54***
**U.S. Cl. 428—626** **14 Claims**

1. In a process for the adhesive metallization of polyimide through pretreatment of the polyimide and subsequent activation as well as chemical metallizing followed, if necessary, by

galvanic metal deposition, the improvement comprising pretreating the polyimide with an aqueous solution of alkali hydroxide and an organic nitrogen compound selected from the group consisting of N,N,N',N'-tetra-(2-hydroxypropyl)-ethylenediamine, ethylenediaminetetraacetic acid and nitrilotriacetic acid.

13. Polyimide-metal composite material, produced according to the process of claim 1.

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## 4,517,255
## METHOD FOR PRODUCTION OF METAL SHEET COVERED WITH POLYESTER RESIN FILM

**Katsumi Kanda, Kudamatsu; Takaaki Okamura, Yanai; Takashi Minamigi, Hikari; Tsuneo Inui, Tokuyama, and Yoshikazu Kondo, Kudamatsu, all of Japan, assignors to Toyo Kohan Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 398,694, Jul. 15, 1982, abandoned. This application Dec. 7, 1983, Ser. No. 559,029**

**Int. Cl.³ B32B** *15/08*

**U.S. Cl. 428—626** **17 Claims**

1. A method for laminating a polyester resin film to a metal sheet covered with double layer consisting of an upper layer of hydrated chromium oxide having sulfur and fluorine therein, the atomic ratio of sulfur and fluorine to the total of chromium, oxygen, sulfur and fluorine in the hydrated chromium oxide being 0.1 to 2.5 atomic % and 0.5 to 10 atomic %, respectively, and a lower layer of metallic chromium, which comprises heating the metal sheet to a temperature above the melting point of said polyester resin film, placing the film thereon and then quenching the laminate.

17. The polyester resin film laminated metal sheet which is covered with double layer consisting of an upper layer of hydrated chromium oxide and a lower layer of metallic chromium according to any one of claims 1 to 8 or 9 to 16.

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## 4,517,256
## WELDED CAN BODIES

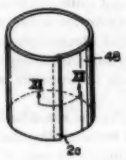
**Kenji Matsuno, Yokohama, and Hiroyuki Funamoto, Tokyo, both of Japan, assignors to Toyo Seikan Kaisha, Limited, Tokyo, Japan**

**Continuation of Ser. No. 336,229, Dec. 31, 1981, abandoned, which is a division of Ser. No. 150,775, May 19, 1980, abandoned. This application Aug. 26, 1983, Ser. No. 526,928**

**Claims priority, application Japan, Dec. 29, 1978, 53-165078; Aug. 6, 1979, 54-99479; Aug. 23, 1979, 54-106696**

**Int. Cl.³ B65D** *7/34, 7/42*

**U.S. Cl. 428—629** **14 Claims**




1. In a tinfree steel welded can body having a side seam made from a can body preform having a side lapped portion by effecting a resistance mash seam forge welding of said lapped portion while pressing said lapped portion between opposing electrodes, said preform being formed from a blank of tinfree steel having a surface layer consisting of a metallic chromium layer and a chromium oxide layer and covering an area around the portion to be welded, said side seam having a thickness of 1.0 to 1.6 times as large as the thickness of the blank, the improvement wherein

said electrodes are a cooled elongated electrode and a cooled rotary electrode, the latter rolling on the lapped portion,

the surface layer of the area around the portion to be welded is not removed such that at least the portion of the inner surface of said side seam which was brought into contact with said elongated electrode is covered with said surface layer,

said electrodes are supplied with sufficient current, and have a sufficiently large contact area with said lapped portion so as to sufficiently cool the surface layer area of the lapped portion wherein

solid phase weld portions are formed in the vicinity of the surfaces of said side seam, and

a melt weld portion is formed to be confined inside said side seam such as to cross said solid phase weld portion and is uniform along the length of said side seam, and wherein the seam meets substantially flush with the can body at the inside surface of the latter.

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## 4,517,257
## RECORDING MEDIA COMPRISING VERTICAL MAGNETIZATION LAYERS ESSENTIALLY CONSISTING OF QUATERNARY Co—Ni—Zn—P ALLOYS

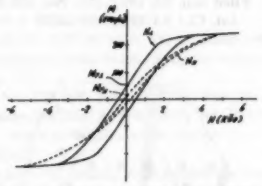
**Shigeo Shimizu, Yokohama, and Toshio Kato, Yamato, both of Japan, assignors to Victor Company of Japan, Ltd., Japan**

**Filed Sep. 13, 1983, Ser. No. 531,681**

**Claims priority, application Japan, Sep. 14, 1982, 57-158926**

**Int. Cl.³ G11B** *5/64*

**U.S. Cl. 428—694** **4 Claims**



1. A magnetic recording medium for vertical magnetization recording which comprises a substrate and a magnetic film of a Co—Ni—Zn—P alloy formed on at least one side of the substrate, said alloy consisting essentially of from 3 to 42 wt% of Co, from 54 to 89 wt% of Ni, from 4 to 8 wt% of P, and from 0.1 to 3.2 wt% of Zn provided that $(7.2\ X_p+12.8)$ wt% $\leqq X_{Ni} \leqq (7.2\ X_p+43.2)$ wt% in which $X_p$ represents a content of P and $X_{Ni}$ represents a content of Ni, both expressed by wt% whereby said magnetic film satisfies the following inequality: $K\perp > 2\pi Ms^2$ wherein $K\perp$ is an intrinsic vertical anisotropy constant, and $2\pi Ms^2$ is a saturation magnetization.

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## 4,517,258
## ELECTROCHEMICAL GENERATOR OPERATING DEVICE WITH A ZINC NEGATIVE ELECTRODE

**Guy Bronoël, Versailles, France, assignor to T.R.E.G.I.E., Rueil Malmaison, France**

**Filed Oct. 21, 1983, Ser. No. 544,229**

**Claims priority, application France, Oct. 21, 1982, 82 17625**

**Int. Cl.³ H01M** *8/18*

**U.S. Cl. 429—21** **13 Claims**

1. An electric storage battery having a plurality of electrochemical generator operating devices each having a zinc nega-

tive electrode and operating in a charge and a recharge phase with each of said devices comprising:

a plurality of approximately horizontal parallel pipes (15) having a rectangular cross section whose lower face consists of a negative upper face (6) of a flat bipolar current collector (3) and wherein a upper face of each of said parallel pipes includes a separator (4) and whose lateral faces are made of an inert material resistant to an alkaline medium;

a positive electrode;

a fluid capable of circulating in said plurality of horizontal pipes wherein said fluid includes a alkaline electrolyte charged with zinc salts and a plurality of spherical-shaped particles with said particles having a core made of a material resistant to electrochemical attack and which core is at least partially coated with a conductive coating whereby the density of said particles is greater than that of said electrolyte and whereby said particles come into contact by sedimentation with said negative upper face of said flat bipolar current collector when said fluid consisting of said aikaline electrolyte and said particles is not in circulation and wherein said particles are charged with zinc at said collector; wherein each of said plurality of operating devices are superposed vertically on one another so that said horizontal pipes of each operating device are superposed on the horizontal pipes of another operating device and wherein each of said superposed pipes are connected to each other by transfer pipes for transferring said fluid successively to each of said superposed pipes and wherein the output of said fluid from an upper element is opposite the input of the fluid in the element immediately below said upper element and whereby said fluid at the input of said upper element is discharged and recovered so that said particles of said fluid entrained by the flow of said electrolyte make a zig-zag parallel back and forth travel in successive elements in said vertically disposed devices by the continuous contact of said particles against the negative face of said current collector of each of said elements; and wherein said electric storage battery further comprises;

intermittent pump means for intermittently circulating said fluid into said plurality of horizontal parallel pipes of each of said operating devices wherein said intermittent pump means operates according to a periodic off-on cycle during both said recharge and said discharge phases of said device in such a manner that the off time of said pump is greater than the on time of said pump.

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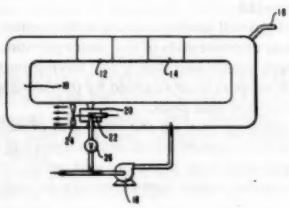
**4,517,259**

## AIR MOTOR DRIVE FOR FUEL CELL POWER PLANT AIR CIRCULATOR

**Joseph R. Lance, North Huntingdon Township, West Moreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 23, 1984, Ser. No. 592,982**
**Int. Cl.³ H01M *8/04***
**U.S. Cl. 429—26** **6 Claims**



**1.** A fuel cell power plant comprising:

a fuel cell assembly for production of electric power and heat,

compressor means for providing relatively high pressure oxygen bearing gas to the fuel cell power plant from relatively low pressure oxygen bearing gas,

means for supplying said relatively low pressure gas to the compressor means,

means for exhausting said relatively high pressure gas from the fuel cell power plant,

conduit means for containing the relatively high pressure gas and directing flow of said high pressure gas to and from the fuel cell assembly,

cooling means for rejecting the heat produced by the fuel cell assembly, and

circulation means for moving the relatively high pressure gas contained within the conduit means in the direction and at a rate that are predetermined, said circulation means powered by a gas driven motor deriving power from one of the group consisting of a gas pressure difference within said fuel cell power plant and a gas pressure difference between said fuel cell power plant and atmospheric pressure.

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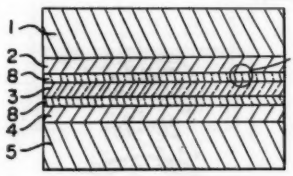
**4,517,260**

## SINGLE COMPONENT CELL FOR PHOSPHORIC ACID TYPE FUEL CELL

**Kenro Mitsuda, Takatsuki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed May 4, 1984, Ser. No. 607,211**
**Claims priority, application Japan, May 17, 1983, 58-87873**
**Int. Cl.³ H01M *8/02***
**U.S. Cl. 429—41** **5 Claims**




**1.** A single component cell for a phosphoric acid type fuel cell, which comprises in combination:

(a) an oxidant electrode and a fuel electrode, each having a catalyst layer;

(b) a matrix base interposed between the catalyst layers of said both electrodes, and consisting principally of phosphoric-acid-resistant inorganic substance powder; and

(c) a buffer layer consisting principally of zirconium phosphate, and interposed between said matrix base and at least one of said catalyst layers for said both electrodes.

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**4,517,261**

## HYDROGEN GAS RELIEF VALVE

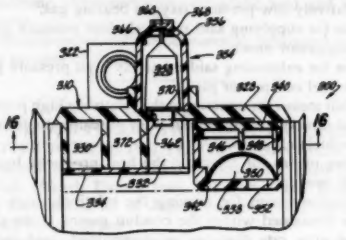
**Curtis C. Whittlesey, Birmingham, Mich., assignor to Energy Development Associates, Inc., Madison Hgts., Mich.**

**Filed Jul. 1, 1983, Ser. No. 510,401**
**Int. Cl.³ H01M *2/12***
**U.S. Cl. 429—64** **9 Claims**

**1.** In a zinc-chloride battery having a plurality of electrically connected cells from which hydrogen gas is generated when a zinc deposit is present on the negative electrodes of said cells and an aqueous zinc-chloride electrolyte is in communication with said cells, and means for circulating said electrolyte through said cells, the improvement comprising:

means for defining a substantially closed compartment in said battery for containing said cells and at least a portion of said electrolyte; and

means in association with said compartment means for selectively venting said hydrogen gas from the interior of said



compartment means in response to the level of said electrolyte within said compartment means.

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**4,517,262**

## VENT FOR A STORAGE BATTERY

**David B. Beidler, Gilbertsville, Pa., assignor to General Battery Corporation, Reading, Pa.**

**Filed Dec. 21, 1983, Ser. No. 564,013**
**Int. Cl.³ H01M 2/12**
**U.S. Cl. 429—87** **20 Claims**

1. A vent cap for enclosing a filler opening of a storage battery, comprising:

(a) a generally cylindrical base portion adapted at a first end thereof to enter into and to engage the filler opening and terminating at the other end thereof in a rim including an inwardly disposed, essentially U-shaped channel said first end further having a closure member which extends inwardly and defines an aperture which is less in diameter than the diameter at said rim, with the cylinder being unrestricted as it extends from said first end toward said rim; and

(b) a cover portion having a periphery engaging the channel of the base portion and a downwardly depending member which terminates a first baffle means which project outwardly from the depending stem at an angle which progresses generally away from the cover portion and toward the aperture defined in said closure member;

(c) wherein the periphery of the cover portion incorporates an essentially planar face having a chamfered termination and a plurality of circumferentially spaced shaped portions formed therein; and

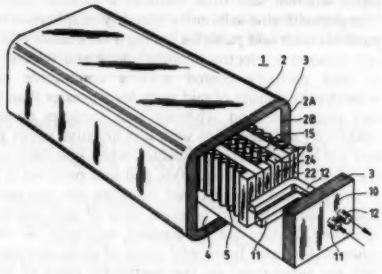
(d) wherein the shaped portions cooperate with the channel to develop a plurality of apertures disposed about the interface between the base portion and the cover portion.

**4,517,263**

## HIGH-TEMPERATURE STORAGE BATTERY

**Harald Reiss, Leimen, and Botho Ziegenbein, Neckarsteinach, both of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie AG, Mannheim-Käfertal, Fed. Rep. of Germany**

**Filed Nov. 21, 1983, Ser. No. 553,700**
**Claims priority, application Fed. Rep. of Germany, Nov. 20, 1982, 3242901**
**Int. Cl.³ H01M 10/50**
**U.S. Cl. 429—120** **6 Claims**



1. A high-temperature storage battery comprising a double-walled housing with insulating material between the two walls of the housing, a plurality of storage cells in the interior of the housing associated with one or more heat exchangers in the form of a slab-shaped heat sink which have at least two large cooling surfaces and in their interior several cooling loops, each cooling loop formed by at least two canals arranged vertically one below the other and connected to each other at a first end of the heat sink via a deflection opening, each cooling loop having only one entrance opening and only one exit opening for introduction and discharge of a cooling medium, the entrance opening is in communication with a common feed canal and the exit opening is likewise in communication with a common discharge canal for the coolant, the entrance opening of the cooling loop is arranged at a second end of the heat sink in the vicinity of a first cooling surface of said two large cooling surfaces and the exit opening of the cooling loop is installed at the second end in the vicinity of the second cooling surface of said two large cooling surfaces, the storage cells having their longitudinal axes perpendicular to the canals of the cooling loops, and the storage cells arranged in a row and installed in a heat-conducting connection along the cooling surfaces.

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**4,517,264**

## LIGHTWEIGHT METAL-HYDROGEN CELL WITH IMPROVED PLATE STACK SUPPORTING MEANS

**Lee E. Miller, Carl Junction; Dennis D. Carr, Jasper, both of Mo., and Donald L. Smith, Miami, Okla., assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio**

**Filed Aug. 24, 1983, Ser. No. 525,986**
**Int. Cl.³ H01M 2/00**
**U.S. Cl. 429—163** **7 Claims**

1. A metal-gas cell having a casing with a center portion and domed ends at opposite ends of the center portion, comprising:

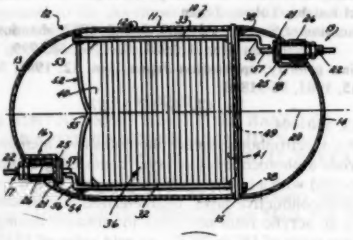
a plate stack within said casing and having two ends,

plate stack support means carried by the casing and supporting one end of said stack,

a spring exerting force on the other end of said plate stack opposite said support means and compressing said stack in an longitudinal axial direction, said spring comprising an arcuate spring which bears centrally on said plate stack, and

a spring mounting means mounting the spring in fixed position in relation to said casing, said spring mounting means

comprising a stop on the inside surface of the casing against which an edge portion of said spring is seated, said spring being external to the plate stack and located between the plate stack and said casing.



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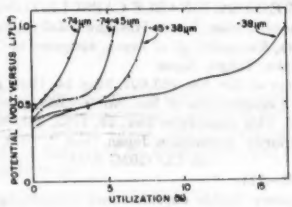
**4,517,265**

## COMPOSITE AND FLEXIBLE ANODES FOR LITHIUM CELLS IN NON-AQUEOUS MEDIUM

**André Bélanger; Denis Fauteux, both of Ste-Julie, and Michel Gauthier, Laprairie, all of Canada, assignors to Hydro-Quebec, Montreal, Canada**

**Filed Sep. 30, 1982, Ser. No. 430,696**
**Claims priority, application Canada, Jun. 30, 1982, 406358**
**Int. Cl.³ H01M *4/62, 4/60***
**U.S. Cl. 429—217** **18 Claims**




1. An anode in the form of a flexible composite thin film comprising a composition of the combination of the following ingredients:

a plastic or elastomeric macromolecular material with ionic conduction;

a finely divided alloy of lithium having a granulometry lower than 40 μm and selected so that the activity in the lithium in said alloy corresponds to potentials which are lower than +1.2 volts with respect to a lithium electrode; and

particles of a carbon compound of the formula: $Li_xC$ where $0 \leq x < 0.3$, said particles of the carbon compound being finely divided to a granulometry lower than 40 μm, and being present in an amount ranging from about 15 to about 40 volume percent of the anode composition.

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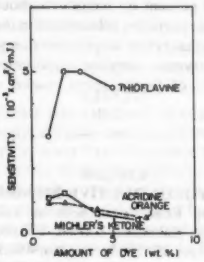
**4,517,266**

## HOLOGRAPHIC RECORDING MATERIAL AND PROCESS FOR PRODUCING HOLOGRAMS

**Kasumi Ikegami, Kokubunji, and Hirofumi Okuyama, Sagamihara, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jan. 18, 1983, Ser. No. 458,850**
**Claims priority, application Japan, Jan. 18, 1982, 57-5695**
**Int. Cl.³ G03C *1/70, 9/08*; G03H *1/04***
**U.S. Cl. 430—2** **4 Claims**

1. A holographic recording material comprising a vinylcarbazole polymer containing carbazolyl rings, a cyclic cis-α-dicarbonyl compound capable of forming a radical by light irradiation and Thioflavine as a photosensitizer or a spectral sensitizer.

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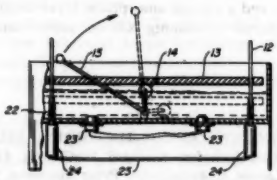
**4,517,267**

## PROCESSING MACHINE FOR PRINTING

**Charles Berger, Ben Lomond, and Kenneth Ruth, Davenport, both of Calif., assignors to Archival Color Technologies, San Francisco, Calif.**

**Filed Jan. 13, 1983, Ser. No. 457,639**
**Int. Cl.³ G03H *3/00*; G03C *5/24***
**U.S. Cl. 430—3** **1 Claim**




1. In a pigment process for producing an image comprising substantially water insoluble pigmented gelatin on a support sheet, the improvement comprising the step of selectively removing soft substantially water soluble gelatin in an aqueous environment in the presence of said image by ultrasonic vibration and mechanical agitation, wherein said mechanical agitation is provided by vibration of a plate accommodating said sheet, said plate being loosely accommodated by a plurality of rods vertically disposed in a container, said rods affixed to motors providing vibratory motion whereby vibrational movement of each of said rods by said motors imparts agitational motion to said plate; and said ultrasonic vibration is provided by ultrasonic frequency transducing means; whereby said ultrasonic vibration and said mechanical agitation are sufficient to cause separation of said soft gelatin from said sheet while retaining said image intact.

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**4,517,268**

## PROCESS FOR MAGNETIC IMAGE CHARACTER RECOGNITION

**Robert J. Gruber, Pittsford; John F. Knapp, Fairport, and Steven B. Bolte, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sep. 12, 1983, Ser. No. 531,520**
**Int. Cl.³ G03G *9/02***
**U.S. Cl. 430—39** **12 Claims**

1. An improved process for generating documents which comprises providing the document desired, imprinting characters thereon by electrostatographic methods with a high speed

electronic printing device, and developing the characters with a magnetic developer composition comprised of from about 20 percent by weight to about 70 percent by weight of magnetite, and from about 30 percent by weight to about 80 percent by weight of toner resin particles, selected from the group consisting of styrene methacrylate copolymers, styrene butadiene copolymers, and styrene acrylate copolymers; and carrier particles comprised of ferrite cores coated with polymeric compositions.

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4,517,269

## PHOTOCONDUCTIVE MEMBER

**Isamu Shimizu, and Kozo Arao, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 20, 1983, Ser. No. 486,940**

**Claims priority, application Japan, Apr. 27, 1982, 57-70771; Apr. 27, 1982, 57-70774; Apr. 27, 1982, 57-70776; Apr. 28, 1982, 57-71951; Apr. 28, 1982, 57-71953; Apr. 28, 1982, 57-71954; Apr. 28, 1982, 57-71956; Apr. 30, 1982, 57-73025**

**Int. Cl.³ G03G *5/14***

**U.S. Cl. 430—57** **45 Claims**

1. A photoconductive member comprising a support for a photoconductive member, a first amorphous layer having a layer constitution comprising a first layer region comprising an amorphous material containing silicon atoms and 1 to $9.5\times10^5$ atomic ppm of germanium atoms and 0.01 to 40 atomic % of at least one of hydrogen atoms and halogen atoms, and a second layer region comprising an amorphous material containing silicon atoms and exhibiting photoconductivity, said first and second layer regions being provided successively from the side of said support; and a second amorphous layer comprising an amorphous material containing silicon atoms and carbon atoms.

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4,517,270

## ELECTROPHOTOGRAPHIC RECORDING MEDIUM

**Fritz Graser, Ludwigshafen; Gerhard Hoffmann, Otterstadt; Reinhold J. Leyrer, Ludwigshafen; Peter Neumann, Wiesloch, and Manfred Patsch, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

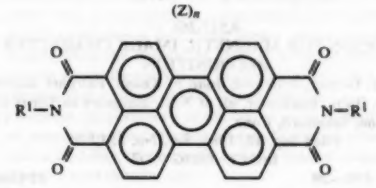
**Filed Mar. 16, 1982, Ser. No. 358,527**

**Claims priority, application Fed. Rep. of Germany, Mar. 20, 1981, 3110954**

**Int. Cl.³ G03G *5/06***

**U.S. Cl. 430—58** **3 Claims**

1. An electrophotographic recording medium which consists essentially of an electrically conductive base, a first layer containing charge carrier-producing dyes, and a second layer which is substantially transparent to actinic light and is composed to an insulating organic material containing at least one compound which is charge carrier-transporting when exposed to light, wherein the charge carrier-producing dye contained in the first layer is dark in color, possesses substantially panchromatic adsorption characteristics, and is of the formula II



$(Z)_n$ (II)

where n is 1–6, Z is p-phenylazoanilino, phenylthio or anilino, and $R^1$ is hydrogen.

4,517,271

## ELECTROPHOTOGRAPHIC CDS PHOTOSENSITIVE MEMBER WITH ACRYLIC RESIN BINDER

**Masaaki Hirooka, Toride; Keiji Kubo, Kawasaki, and Toshiyuki Yoshihara, Mitaka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 384,609, Jun. 3, 1982, abandoned. This application Mar. 1, 1984, Ser. No. 583,799**

**Claims priority, application Japan, Jun. 12, 1981, 56-90456; Jun. 15, 1981, 56-91880**

**Int. Cl.³ G03G *5/087***

**U.S. Cl. 430—94** **6 Claims**

1. An electrophotographic photosensitive member which comprises a photoconductive layer comprising cadmium sulfide bonded with a binder resin, and an insulating layer laid on said photoconductive layer, characterized in that said binder resin is an acrylic resin not labile to moisture having a glass transition point of 15° to 70° C., an acid valve of 10 to 40, and a number average molecular weight of 10,000 or more.

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4,517,272

## ELECTROSTATIC DRY TONER COMPOSITION

**Thomas A. Jadwin, Rochester, and Donald S. Rimai, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 12, 1983, Ser. No. 522,955**

**Int. Cl.³ G03G *9/08***

**U.S. Cl. 430—110** **6 Claims**

1. An electrostatic dry toner composition comprising finely divided polymer particles admixed with a silicone oil.

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4,517,273

## PRESSURE FIXABLE CAPSULE TONER

**Sukejiro Inoue, Toride; Tetsuo Hasegawa, Tokyo, and Yoshihiro Nishikawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 263,607, May 14, 1981, abandoned, which is a continuation of Ser. No. 092,069, Nov. 7, 1979, abandoned. This application Dec. 29, 1983, Ser. No. 565,532**

**Claims priority, application Japan, Nov. 9, 1978, 53-138187**

**Int. Cl.³ G03G *9/16***

**U.S. Cl. 430—111** **7 Claims**

1. A pressure fixable capsule toner comprising a pressure fixable core material encapsulated with a coating material in which the main particle size of the capsule toner, a in microns, the main particle size of the core material, b in microns, and the hardness of the core material, y in dmm, by Japanese Industrial Standard-K2530 satisfy the formula:

$$0.01 \exp(a-b) \leqq y \leqq 5 \exp(a-b)$$

wherein y is from 0.1–100 dmm and wherein 70% or more of the capsule toner particles are within (∓)3 microns of the main particle size, a.

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4,517,274

## METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

**Nobuyasu Honda, Tenri; Toshiro Yamakawa, Osaka, and Toshimitsu Ikeda, Himeji, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Filed Aug. 30, 1983, Ser. No. 527,822**

**Claims priority, application Japan, Aug. 31, 1982, 57-149888; Oct. 22, 1982, 57-184730; Feb. 28, 1983, 58-31033**

**Int. Cl.³ G03G *9/14, 13/09***

**U.S. Cl. 430—122** **8 Claims**

1. A method for developing electrostatic latent images, which comprises frictionally contacting the surface of a substrate having an electrostatic latent image formed thereon with a magnetic brush of a developer formed on a developer-delivering sleeve having a magnet disposed therein, wherein a magnetic brush is formed on the sleeve with an earing promoting component consisting essentially of sintered ferrite parti-

cles having a residual magnetism of 0 to 1.0 e.m.u./g, a coercive force of 0 to 5 Oe and a particle size of 20 to 100 microns, and a developer component comprising particles of a dispersion of a magnetic powder in a binder medium having a particle size of 5 to 50 microns, and the ratio of the earing-promoting component to the developer component being within the range of 80:20 to 10:90, and wherein the electrostatic latent image is developed only by the developer component.

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**4,517,275**

## LIGHT-SENSITIVE MIXTURE BASED ON O-NAPHTHOQUINONE-DIAZIDES, AND LIGHT-SENSITIVE COPYING MATERIAL PREPARED THEREFROM

**Paul Stahlhofen, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

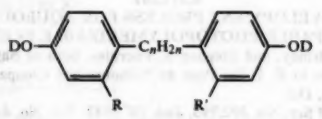
**Filed Jun. 23, 1982, Ser. No. 391,005**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1981, 3124936**

**Int. Cl.³ G03F *7/08*; G03C *1/54*; C07C *113/00***

**U.S. Cl. 430—165** **5 Claims**

1. A light-sensitive mixture which contains a binder which is insoluble in water, but soluble or at least swellable in aqueous alkaline solutions, and as the light-sensitive compound, a 1,2-naphthoquinone-2-diazide-4-sulfonic or 1,2-naphthoquinone-2-diazide-5-sulfonic acid ester of a bis-hydroxy-phenylalkane, wherein the naphthoquinonediazide sulfonic acid ester corresponds to the general formula I




in which D is the 1,2-naphthoquinone-2-diazide-5-sulfonyl radical or the 1,2-naphthoquinone-2-diazide-4-sulfonyl radical, R and R' are hydrogen atoms, alkyl groups having 1 to 4 carbon atoms or radicals of the formula DO, and n denotes an integer from 10 to 18.

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**4,517,276**

## METAL-CONTAINING ORGANIC PHOTORESISTS

**Carol R. Lewis, Palo Alto, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Nov. 29, 1982, Ser. No. 445,353**

**Int. Cl.³ G03C *1/60, 1/72*; G03F *7/26***

**U.S. Cl. 430—192** **10 Claims**

1. An electron beam sensitive negative photoresist composition having improved radiation sensitivity and requiring shortened exposure time comprising a cresol formaldehyde resin which has been pre-reacted with an organometallic halide of the formula:

$$R_yMX$$

wherein R is an alkyl or aryl, M is a metal, and X is a halogen, and $1<y<4$.

5. An electron beam sensitive negative photoresist composition which possesses negative photoresist properties having improved radiation sensitivity and requiring shortened exposure time comprising in admixture:

(a) the pre-reaction product of an organic resist resin which has a reactive hydroxyl group and an organometallic halide compound of the formula:

$$R_yMX$$

wherein R is an alkyl, aryl, alkaryl, or aralkyl group, M is a metal, X is a halogen, and $1<y<4$ wherein the organic resist resin which has been pre-reacted with the organometallic halide compound contains 0.4–45 weight percent of metal based on the weight percent of the resin and contains at least 50–99 percent available hydrogen sites after reaction with said organometallic compound,

(b) an o-quinone diazide, and

(c) an organic solvent.

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**4,517,277**

## PHOTOSENSITIVE RECORDING MATERIAL SUITABLE FOR THE PRODUCTION OF PRINTING PLATES AND RELIEF PLATES, AND THE PRODUCTION OF THESE PLATES USING THIS RECORDING MATERIAL

**John Lynch, Monsheim; Herbert Naarmann, Wattenheim; Günther Schulz; Rudolf Vyvial, both of Ludwigshafen; Günter Wallbillich, Schifferstadt, and Manfred Zürger, Sinsheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Oct. 29, 1982, Ser. No. 437,699**

**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1981, 3144905**

**Int. Cl.³ G03C *1/68*; C08F *8/02***

**U.S. Cl. 430—281** **5 Claims**

1. A photosensitive recording material which is suitable for the production of printing plates and relief plates and comprises

(a) a dimensionally stable base B and

(b) a photopolymerizable, relief-forming layer R having a thickness of from 300 μm to 7 mm which is firmly bonded to the base,

can be developed with water and consists of a mixture of

(b1) a polymeric binder containing a polymerizable polyvinylalcohol derivative,

(b2) at least one ethylenically unsaturated, photopolymerizable, low molecular weight compound which is compatible with the polymeric binder, and

(b3) at least one photopolymerization initiator, with or without

(b4) further conventional additives and/or assistants, wherein the photopolymerizable relief-forming layer R contains, as the polymeric binder, not less than 1% by weight, based on the total polymeric binder (b1), of a polyvinylalcohol derivative which is obtained by reacting polyvinylalcohol with an acylating agent which possesses groups which can be polymerized by free radicals, the reaction being carried out in the heterogeneous phase, in an aprotic dispersant, using the acylating agent in an amount which corresponds to not less than twice the molar amount required to achieve the desired degree of acylation.

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**4,517,278**

## FLEXOGRAPHIC PRINTING PLATES AND PROCESS FOR MAKING THE SAME

**Kiyomi Sakurai, Neyagawa, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 224,499, Jan. 13, 1981, abandoned, which is a continuation-in-part of Ser. No. 647,717, Jan. 9, 1976, abandoned, and a continuation of Ser. No. 92,291, Nov. 8, 1979, abandoned. This application Aug. 13, 1982, Ser. No. 407,825**

**Int. Cl.³ G03C *1/72***

**U.S. Cl. 430—286** **3 Claims**

1. A molded sheet suitable for use as a flexographic printing plate which is melt-molded from a photosensitive resin composition comprising syndiotactic 1,2-polybutadiene permeated with a solution of an ethylenically unsaturated monomer and a photo-polymerization initiator, the syndiotactic 1,2-polybutadiene having an average molecular weight of from about 10,000 to 300,000, a 1,2-unit content of at least about 80 percent and a crystallinity of about 10 to 30 percent, the ethylenically unsaturated monomer being an ester of acrylic or methacrylic acid with an alkanol having from 4 to 20 carbon

atoms, and the photo-polymerization initiator being benzoin or an alkyl ether thereof.

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**4,517,279**

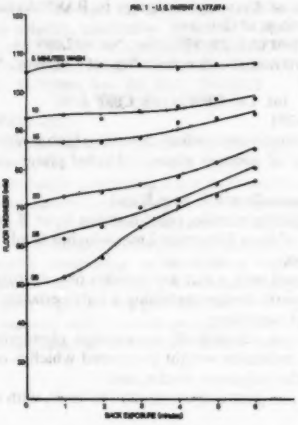
## PHOTOSENSITIVE ELASTOMERIC POLYMER COMPOSITION FOR FLEXOGRAPHIC PRINTING PLATES - PROCESSABLE IN SEMI-AQUEOUS BASIC SOLUTION OR SOLVENT SYSTEMS

**John R. Worns, Mishawaka, Ind., assignor to Uniroyal, Inc., Middlebury, Conn.**

**Continuation of Ser. No. 413,581, Aug. 31, 1982, abandoned. This application Jul. 26, 1984, Ser. No. 634,732**

**Int. Cl.³ G03C *1/68***

**U.S. Cl. 430—286** **7 Claims**



1. A homogeneous elastomeric photosensitive composition suitable for inclusion in a flexographic printing plate consisting essentially of:

(A) 40 to 90% by weight of the total composition of a high molecular weight butadiene/acrylonitrile carboxylated copolymer having a number average molecular weight of 30,000 to 125,000, an acrylonitrile content of 10 to 50%, and a carboxyl content of 1% to 15% by weight.

(B) 5 to 60% by weight of the total composition of a high molecular weight butadiene/acrylonitrile noncarboxylated copolymer having a number average molecular weight of 50,000 to 100,000, an acrylonitrile content of 10 to 30% so that the combination of the carboxylated and noncarboxylated high molecular weight copolymers give a composition with a carboxyl content of 3 to 10%.

(C) 2 to 40% by weight of the total composition of an addition photopolymerizable ethylenically unsaturated monomer and

(D) 0.1 to 10% by weight of the total composition of a photoinitiator activatable by actinic radiation.

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**4,517,280**

## PROCESS FOR FABRICATING INTEGRATED OPTICS

**Kenji Okamoto; Yoshikazu Nishiwaki; Shunji Matsuoka, and Yozo Nishiura, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Nov. 3, 1983, Ser. No. 548,591**

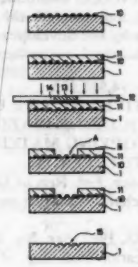
**Claims priority, application Japan, Nov. 4, 1982, 57-194150; Nov. 6, 1982, 57-194817**

**Int. Cl.³ G03C *5/00***

**U.S. Cl. 430—321** **12 Claims**

1. A process for making a diffraction grating pattern on a substrate, said process comprising the steps of:

applying a first material and a second material onto said substrate such that one of said first and second material forms a diffraction grating pattern on a first area of said substrate and the other one of said first and second materials substantially covers a second area of said substrate and does not cover said first area;



etching the portions of said first area not covered by said one material;

removing said first and second materials.

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**4,517,281**

## DEVELOPMENT PROCESS FOR AQUEOUS DEVELOPABLE PHOTOPOLYMERIZABLE ELEMENTS

**Gary C. Briney, and Stephen J. Fuerniss, both of Sayre, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 392,795, Jun. 28, 1982, Pat. No. 4,485,167, which is a continuation of Ser. No. 193,919, Oct. 6, 1980, abandoned. This application Feb. 6, 1984, Ser. No. 577,551**

**Int. Cl.³ G03C *5/00***

**U.S. Cl. 430—322** **7 Claims**

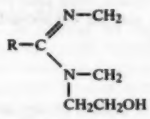
1. A process for improving the rate of development of an aqueous developable photopolymerizable element comprising a support bearing at least one layer of a photopolymerizable composition consisting essentially of

(a) at least one nongaseous ethylenically unsaturated compound capable of forming a high polymer by free-radical initiated chain propagating addition polymerization;

(b) at least one organic acidic polymeric binder soluble in solely aqueous alkaline solvent devoid of organic solvents;

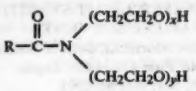
(c) an organic, radiation-sensitive, free-radical generating photoinitiator or photoinitiator system taken from the class consisting of polynuclear quinones, vicinal ketaldonyl alcohols, acyloin ethers, alpha-hydrocarbon-substituted aromatic acyloins, photoreducible dyes and reducing agents including dyes of the phenazine, oxazine and quinone classes, Michler's ketone, benzophenone, 2,4,5-triphenylimidazolyl dimers with hydrogen donors, and mixtures, and

(d) at least 4.0% by weight based on the weight of solids in the photopolymerizable composition of an organic compound or salt of an organic compound taken from the group consisting of



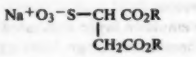
(I)

wherein R is an alkyl chain with 7 to 17 carbon atoms



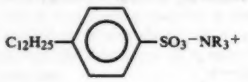
(2)

wherein R is $CH_3(CH_2)_7CH{=}CH(CH_2)_8{-}$, or a mixture of alkyl chains with 16 and 18 carbon atoms and $CH_3(CH_2)_7CH{=}CH(CH_2)_8{-}$, and x+y is 2 to 10;



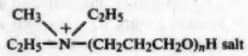
(3)

wherein R is a straight or branched alkyl chain of 8 to 13 carbon atoms;



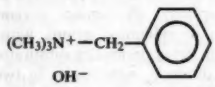
(4)

wherein R is an alkyl chain with 1 to 9 carbon atoms;



(5)

wherein n is 10 to 50;



(6)

$[C_{16}H_{33}N(CH_3)_3{}^+]Br^-$;

$RNHCH_2CH_2COO^-Na^+$

wherein R is an alkyl group derived from coconut oil; and combinations thereof;

which comprises (a) exposing the element imagewise to actinic radiation thereby forming hardened image areas, and (b) removing the unexposed areas unhardened by the actinic radiation by treating the photopolymerized layer with an aqueous developer solution.

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**4,517,282**

## PROCESS FOR DEVELOPING OR PEELING ALKALI-TYPE PHOTOSENSITIVE FILM AND APPARATUS USED THEREIN

**Yoshiaki Tomisawa, Hitachi; Seiji Kinoda, Fujisawa; Eiji Fujita, Hitachi; Masanori Murata, Hitachi; Toshio Takeuchi, Hitachi, and Ken Ogawa, Hitachi, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan**

**Filed Oct. 12, 1982, Ser. No. 434,041**

**Claims priority, application Japan, Oct. 14, 1981, 56-164764**

**Int. Cl.³ G03C** *3/00, 5/30*

**U.S. Cl. 430—399** **2 Claims**

1. A process for developing or imagewisely peeling an alkali-type photosensitive film which comprises

developing or imagewisely peeling an alkali-type photosensitive film with an alkali developing or peeling solution,

taking off the developing or peeling solution containing a released photosensitive film suspension from a developing or peeling device,

introducing a cationic polyamine resin, methyl isobutyl carbinol and a gas into the developing or peeling solution to effect flocculation of particles of the released photosensitive film suspension,

removing the flocculated particles in a floating state from the developing or peeling solution, and

recycling the resulting developing or peeling solution to the developing or peeling device.

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**4,517,283**

## COLOR-PHOTOGRAPHIC RECORDING MATERIAL

**David G. Leppard, Marly, and Jean Rody, Riehen, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Filed Dec. 15, 1983, Ser. No. 562,190**

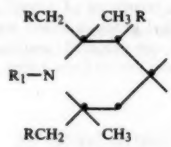
**Claims priority, application Switzerland, Dec. 16, 1982, 7314/82**

**Int. Cl.³ G03C** *7/40, 7/26*

**U.S. Cl. 430—512** **23 Claims**

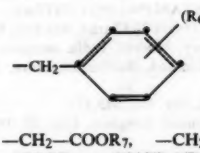
1. A colour-photographic recording material which, in at least one light-sensitive silver halide emulsion layer, an interlayer and/or a protective layer, contains a light stabilizing amount of a stabiliser mixture comprising

(i) a compound which contains at least one group of the formula I



(I)

or a polymer, the recurring structural units of which contain a group of the formula I or are linked via a bivalent group corresponding to the formula I, in which $R_1$ is a free valency and in which, moreover, R is hydrogen or methyl and $R_1$ is methyl, a group $-CH_2-C(R_2){=}C(R_3)(R_4)$, $-CH_2-C{\equiv}C-R_5$,



$-CH_2-COOR_7$, $-CH_2-CON(R_8)(R_9)$, $-COR_{10}$, $-COOR_7$, $-CON(R_8)(R_9)$, $-OR_7$, $-(CH_2)_bOCOR_{10}$, $-CH_2-CH(R_{11})OR_{12}$, $-SOR_{13}$ or $-SO_2R_{13}$, a and b are 0, 1 or 2, $R_2$, $R_3$ and $R_4$ independently of one another are hydrogen or $C_1$–$C_3$-alkyl, $R_5$ is hydrogen or methyl, $R_6$ is $C_1$–$C_4$-alkyl, $R_7$ is $C_1$–$C_{12}$-alkyl, allyl, benzyl or cyclohexyl, $R_8$ is $C_1$–$C_{12}$-alkyl, allyl, cyclohexyl, benzyl or phenyl, $R_9$ is hydrogen, $C_1$–$C_{12}$-alkyl or allyl, or $R_8$ and $R_9$, together with the N atom to which they are linked, form a 5-membered or 6-membered heterocyclic ring, and $R_{10}$ is hydrogen, $C_4$–$C_{12}$-alkyl, $C_2$–$C_6$ alkenyl, chloromethyl, $C_5$–$C_8$-cycloalkyl, $C_7$–$C_{14}$-aralkyl or $C_7$–$C_{10}$-alkylphenyl, $R_{11}$ is hydrogen, $C_1$–$C_4$-alkyl, $C_2$–$C_{13}$-alkoxymethyl, phenyl or phenoxymethyl, $R_{12}$ is hydrogen, $C_1$–$C_{12}$-alkyl, $-COR_{10}$ or $-CON(R_8)(R_9)$ $R_8$, $R_9$ and $R_{10}$ being as defined above, and $R_{13}$ is $C_1$–$C_{12}$-alkyl, phenyl or $C_7$–$C_{14}$-alkaryl, and

(ii) a phenolic antioxidant.

4,517,284

## LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

Nobuaki Kagawa; Noboru Fujimori, both of Hino; Shigeo Tanaka, and Kaoru Onodera, both of Odawara, all of Japan, assignors to Konishiroku Photo Ind. Co., Ltd., Tokyo, Japan

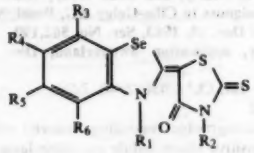
Filed Nov. 18, 1982, Ser. No. 442,768

Claims priority, application Japan, Nov. 26, 1981, 56-190383; Nov. 26, 1981, 56-190384

Int. Cl.³ G03C 1/02

U.S. Cl. 430—591 12 Claims

1. A light-sensitive silver halide photographic material having at least one silver halide emulsion layer on a support characterized in that silver halide in said emulsion layer comprises silver halide grains containing at least 80 molar % of silver chloride and at least one merocyanine dye having the formula (I)



(I)

wherein $R_1$ is selected from the group consisting of an alkyl group, an alkenyl group and an aryl group and $R_2$ is selected from the group consisting of an alkyl having a sulfo substituent and an aryl having a sulfo substituent; and $R_3$, $R_4$, $R_5$ and $R_6$ are each selected from the group consisting of a hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group and a phenyl group and any one pair of $R_3$ and $R_4$, $R_5$ and $R_6$, $R_1$ and $R_6$ or $R_4$ and $R_5$ may join to form a ring.

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4,517,285

## PAPERMAKING OF POLYOLEFIN COATED SUPPORTS BY CONTROLLING STREAMING POTENTIAL

Antony I. Woodward, Chesham; David G. Clarke, Marlow, both of England, and Sunil Shahaney, Madras, India, assignors to The Wiggins Teape Group Limited, Buckinghamshire, England

Filed Oct. 19, 1983, Ser. No. 543,477

Claims priority, application United Kingdom, Oct. 20, 1982, 8229986; Aug. 18, 1983, 8322323

Int. Cl.³ G03C 1/78; D21H 3/78

U.S. Cl. 430—538 13 Claims

1. A method of making a resin coated paper which comprises making a base paper by an alkaline paper making method from a cellulosic fibrous stock containing from 0.2 to 2% by weight on the fibre content of the stock of an alkyl ketene dimer size, from 0.3 to 4% by weight on the fibre content of the stock of a cationic wet strength resin and an amount, within the range 0.02 to 5% by weight on the fibre content of the stock, of an anionic polyelectrolyte which is adsorbable on the cellulosic fibres, which is such as to maintain the streaming potential of the stock equivalent to a streaming potential in the range of from −1 to −2.5 millivolts per bar (measured at 15° C.) on a stock having a conductivity of about 585 microsiemens (measured at 25° C.), forming a paper from the stock and providing a coating of a polyolefin resin on at least one side of the paper.

4,517,286

## COLOR DIFFUSION TRANSFER LIGHT-SENSITIVE ELEMENT WITH AMINE SOLVENT

Yasuhiro Noguchi, and Masakazu Morigaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Dec. 2, 1983, Ser. No. 557,301

Claims priority, application Japan, Dec. 2, 1982, 57-211943

Int. Cl.³ G03C 1/40, 5/54

U.S. Cl. 430—562 18 Claims

1. A diffusion transfer process light-sensitive element, comprising:

a suprport having coated thereon:

a light-sensitive silver halide emulsion layer associated with a dye image-providing compound which provides a transferred dye image when processed with an alkaline processing composition, wherein said dye image-providing compound is dispersed in a photographic layer in a copresent state with a liquid comprising an organic solvent represented by the following general formula (I):

(I)

wherein $R_1$ represents a substituted or unsubstituted alkyl, aralkyl, cycloalkyl or alkenyl group, $R_2$ represents a hydrogen atom or the same substituent as defined for $R_1$, Ar represents an unsubstituted phenyl group, a methylenedioxyphenyl group, or a phenyl or naphthyl group substituted by a halogen atom, a carboxy group or a substituted or unsubstituted alkyl, aralkyl, alkenyl, cycloalkyl, alkylthio, phenyl, alkoxy, aryloxy, alkylamino, acylamino, carbamoyl, sulfonamido or sulfamoyl group, with the phenyl or naphthyl group being optionally substituted by two or more, same or different, substituents in two or more positions, or $R_1$ and $R_2$ may be connected to each other to form a ring, or either $R_1$ or $R_2$ may be connected to Ar to form a fused ring.

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4,517,287

## METHOD AND REAGENT FOR THE ENZYMATIC DETERMINATION OF ENZYME SUBSTRATES

Peter Scheibe; Erich Bernt, both of Munich, and Sigmar Klose, Berg, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany

Filed Mar. 25, 1980, Ser. No. 133,722

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1979, 2913553

Int. Cl.³ C12Q 1/00, 1/50, 1/62, 1/28

U.S. Cl. 435—4 11 Claims

1. In a reagent for the enzymatic determination of an enzyme substrate, containing a substrate determination system including at least one enzyme, at least one buffer substance and at least one indicator substance, the improvement comprising

including in said reagent a defined amount of the enzyme substrate to be determined, which amount is less than the substrate determination capacity of the said system but is sufficient to react with interfering reagent ingredients.

7. Method for the enzymatic determination of an enzyme substrate with a reagent which contains a system for determining the substrate and interfering substances which can react with the substrate or an intermediate or end product of the indicator reaction, which method comprises reacting, before the addition of the sample to be analyzed, a defined amount of the substrate with said reagent until reaction is complete, and then contacting the sample to be determined with said reagent.

## 4,517,288
## SOLID PHASE SYSTEM FOR LIGAND ASSAY

Joseph L. Giegel, and Mary M. Brotherton, both of Miami, Fla., assignors to American Hospital Supply Corp., Evanston, Ill.

Filed Jan. 23, 1981, Ser. No. 227,664
Int. Cl.³ G01N *33/54*; C12N *9/96*
U.S. Cl. 435—7 23 Claims

1. A competitive method for conducting a solid phase enzyme immunoassay of a fluid sample within the interstices of a solid, inert porous medium, said fluid sample containing an unknown level of analyte, the method comprising

a. immobilizing a binding material within a finite zone of the interstices of the solid, inert porous medium, said binding material being capable of immunological reaction with said analyte from among the constituents of the fluid sample;

b. applying, under binding conditions, to substantially the center of said finite zone, containing said immobilized binding material, a fluid sample containing the analyte for which said binding material is specific, said analyte being applied as a solution so as to permit diffusion thereof within the interstices of a reaction zone of the porous medium;

c. applying an enzyme-labeled indicator to substantially the center of said reaction zone, under conditions which allow said indicator and said analyte to compete for binding sites on said immobilized binding material, said indicator, which comprises an enzyme conjugated to a ligand, being immunochemically bound to said immobilized binding material in a amount which can be correlated to the amount of analyte in said reaction zone;

d. applying, to substantially the center of said reaction zone a stream of eluting solvent containing a substrate for the enzyme of said enzyme-labeled indicator, the quantity of said eluting solvent being sufficient to effect radial chromatographic separation, within said porous medium, of unbound enzyme-labeled indicator from bound enzyme-labeled indicator within said reaction zone; and

e. observing the extent to which the bound enzyme-labeled indicator is present within a delimited area of said reaction zone by measurement of the level of chromophore or fluorophore produced by the action of the bound enzyme-labeled indicator on said substrate, said delimited area of said reaction zone being essentially free of unbound indicator.

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## 4,517,289
## MONOCLONAL ANTIBODIES FOR HUMAN TISSUE CROSS-MATCHING

Edgar L. Milford, Dover; Charles B. Carpenter, Weston, and Jean M. Paradysz, Brighton, all of Mass., assignors to Brigham and Women's Hospital, Boston, Mass.

Filed Aug. 18, 1982, Ser. No. 409,183
Int. Cl.³ G01N *33/54*; C12N *5/00, 15/00*; C12R *1/91*; A61K *39/395*
U.S. Cl. 435—7 12 Claims

1. A hybridoma cell line selected from a group consisting of ATCC HB8156 and ATCC HB8157.

7. A method of typing human tissue, comprising the step of: contacting an antibody produced by a hybridoma cell line selected from the group consisting of ATCC HB8156 and ATCC HB8157 with cells obtained from a human whose tissue type is being determined.

## 4,517,290
## METHOD FOR ENZYME IMMUNOASSAY AND PEPTIDE-ENZYME CONJUGATE AND ANTIBODY THEREFOR

Susumu Iwasa, Tsuzuki; Isamu Yoshida, Takatsuki, and Koichi Kondo, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 244,323, Mar. 16, 1981, abandoned. This application Sep. 19, 1983, Ser. No. 533,619
Claims priority, application Japan, Mar. 31, 1980, 55-42484; Jun. 13, 1980, 55-80467; Jan. 14, 1981, 56-4507
Int. Cl.³ G01N *33/54, 33/56*; A61K *39/395*; C12N *9/96*
U.S. Cl. 435—7 10 Claims

1. An enzyme immunoassay method involving the use of an antibody as a reagent, which comprises using an antibody obtained by inoculating human chorionic gonadotropin into an animal to produce an anti-human chorionic gonadotropin antibody, contacting a body fluid containing the anti-human chorionic gonadotropin antibody thus produced with a peptide of the formula:

$$H\text{-}R_1\text{-}Pro\text{-}Ser\text{-}Asp\text{-}Thr\text{-}Pro\text{-}Ile\text{-}Leu\text{-}Pro\text{-}Gln\text{-}OH$$

wherein $R_1$ is a peptide fragment consisting of 1 to 14 amino acid residues including Gly in the 14-position of

$$Ala^{1}\text{-}Pro^{2}\text{-}Pro^{3}\text{-}Pro^{4}\text{-}Ser^{5}\text{-}Leu^{6}\text{-}Pro^{7}\text{-}Ser^{8}\text{-}Pro^{9}\text{-}Ser^{10}\text{-}Arg^{11}\text{-}Leu^{12}\text{-}Pro^{13}\text{-}Gly^{14},$$

wherein said peptide is synthetically prepared by chemically combining at least one member selected from the group consisting of amino acids and peptide fragments of fewer amino acids than said peptide, said peptide being insolubilized on a carrier, and eluting the anti-human chorionic gonadotropin antibody thus specifically absorbed.

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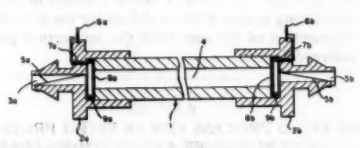
## 4,517,291
## BIOLOGICAL DETECTION PROCESS USING POLYMER-COATED ELECTRODES

James L. Seago, Bear, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 15, 1983, Ser. No. 523,168
Int. Cl.³ C12Q *1/54*
U.S. Cl. 435—14 9 Claims



1. In a method for the amperometric determination of the concentration of a constituent of interest in a biological sample, said method comprising:

(1) contacting said constituent with an oxidase enzyme for which the constituent is a substrate, thereby producing a change in the concentration of an electroactive substance in said sample;

(2) contacting said sample containing said electroactive substance with an inert metal indicator electrode;

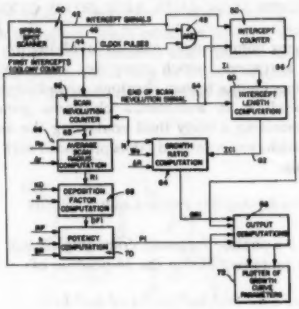
(3) measuring the current flow between said indicator electrode and a counter electrode at a preselected potential difference between said electrodes; and

(4) relating the current to the concentration of the substrate initially present in the biological sample; the improvement comprising: using as the inert metal indicator electrode a noble metal having intimately coated thereon a thin film of perfluorosulfonic acid polymer.

## 4,517,292
## METHOD AND APPARATUS FOR TESTING MICROBIAL INTERACTION WITH GROWTH AFFECTING SUBSTANCES

**Samuel Schalkowsky, Chevy Chase, and William Pepper, Jr., Bethesda, both of Md., assignors to Spiral System Instruments, Inc., Bethesda, Md.**

**Filed May 18, 1982, Ser. No. 379,367**
**Int. Cl.³ C12Q *1/18, 1/24;* C12M *1/26, 1/32***
**U.S. Cl. 435—32** **22 Claims**



1. A method for determining the effect of a growth interacting substance on microbial growth by utilizing an interaction plate which contains visible microbial colonies in a track produced by the programmed deposition of a microbe containing solution on a track on the plate and the programmed deposition of a track of a growth interacting substance on the interaction plate in contact with the microbes and incubating the plate to produce visible colonies of microbes comprising:

(a) scanning the interaction plate with a scanner which scans a spot in a series of adjacent lines to detect a length of interception Li of the spot with the visible colonies of microbes to produce a measurement of the number and size of visible colonies along a line of intersection of the spot with the track;

(b) calculating the width of the track of visible colonies of microbes along the line of intersection of the spot with the track from the detected length of interception; and

(c) calculating the growth ratio GRi for each intersection of the spot with the track of visible colonies of microbes by calculating a ratio of the width of the track for the line of intersection of the spot with the interaction plate and a reference width.

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## 4,517,293
## HIGH YIELD PROCESS FOR IN VITRO PRODUCTION OF SERUM-FREE AND MITOGEN-FREE INTERLEUKIN-2 USING A ROLLER BOTTLE CULTURE SYSTEM

**Hans-Åke Fabricius, Breisach, and Roland Stahn, Holzhausen, both of Fed. Rep. of Germany, assignors to Hooper Trading Co. N.V., Curacao,**

**Division of Ser. No. 418,378, Sep. 15, 1982, Pat. No. 4,448,879, which is a continuation-in-part of Ser. No. 247,769, Mar. 26, 1981, Pat. No. 4,390,623, which is a continuation-in-part of Ser. No. 193,112, Oct. 2, 1980, abandoned. This application Feb. 3, 1984, Ser. No. 576,894**
**Int. Cl.³ C12P *21/00***
**U.S. Cl. 435—68** **4 Claims**

1. A process for producing a serum-free and mitogen-free interleukin-2 containing supernatant comprising:

(1) stimulating IL-2 producing primary cells which have been washed to remove substantially all proteins bound to the external cell membrane surface by incubating the washed cells in a liquid tissue culture medium supplemented with serum protein and a mitogen in a roller bottle cultivation system which is caused to rotate at a speed sufficient to rotate said roller bottle at from about 5 to 20 revolutions per minute to thereby provide a homogeneous culture medium, disperse metabolic products and synthesized proteins throughout the culture medium, and maintain a uniform cell suspension in the culture medium;

(2) separating and washing the stimulated cells to remove substantially all of the serum and mitogen; and

(3) conditioning the cells obtained in step (2) by incubating the cells in the presence of a serum-free and mitogen-free liquid tissue culture medium in a roller bottle cultivation system which is caused to rotate at a speed sufficient to rotate said roller bottle at from about 5 to 20 revolutions per minute to thereby provide a homogeneous culture medium, disperse metabolic products and synthesized proteins throughout the culture medium, and maintain a uniform cell suspension in the culture medium to thereby transfer interleukin-2 into the liquid phase.

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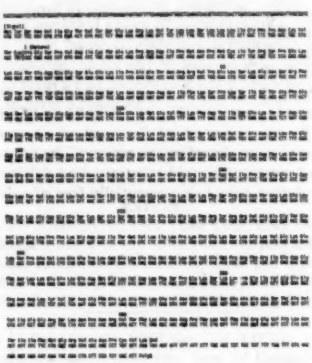
## 4,517,294
## HUMAN ANTITHROMBIN III

**Susan C. Bock, Palo Alto, and Richard M. Lawn, San Francisco, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.**

**Filed Jul. 30, 1982, Ser. No. 403,600**
**Claims priority, application United Kingdom, Mar. 3, 1982, 8206262**
**Int. Cl.³ C12P *21/02;* C12N *15/00, 1/20, 1/00;* C07H *15/12***
**U.S. Cl. 435—70** **10 Claims**



1. A DNA sequence consisting of a sequence encoding human antithrombin III.

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## 4,517,295
## HYALURONIC ACID FROM BACTERIAL CULTURE

**James W. Bracke, Minnetonka, and Kipling Thacker, Minneapolis, both of Minn., assignors to Diagnostic, Inc., Minneapolis, Minn.**

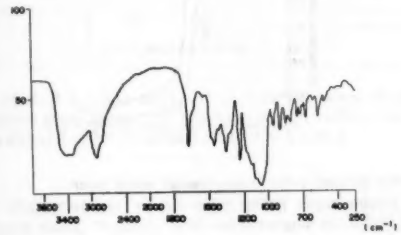
**Filed Feb. 18, 1983, Ser. No. 467,925**
**Int. Cl.³ C12P *19/04;* C12R *1/46***
**U.S. Cl. 435—101** **30 Claims**

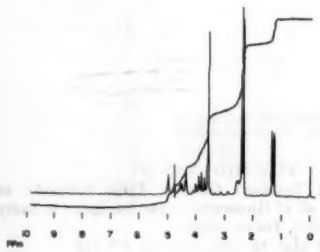
18. In the method of producing hyaluronic acid involving production of same by streptococcus bacteria, the improvement involving the maintenance of $CO_2$-enriched anerobic conditions in the environment of the bacteria growth medium.

## 4,517,296
## ANTIBIOTIC ACMIMYCIN AND ITS PRODUCTION

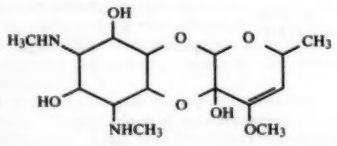
Hideo Sakakibara; Masashi Awata; Shuzo Satoi; Naoki Mutoh; Masaki Takada, and Mitsuo Hayashi, all of Shizuoka, Japan, assignors to Toyo Jozo Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 9, 1983, Ser. No. 530,668
Claims priority, application Japan, Sep. 9, 1982, 57-157921
Int. Cl.[3] C12P *17/18;* C07D *323/04*
U.S. Cl. 435—119 3 Claims





1. Antibiotic acmimycin of the formula



or a pharmaceutically-acceptable acid addition salt thereof.

2. A process for the production of antibiotic acmimycin which comprises culturing an acmimycin-producing microorganism belonging to the genus Streptomyces, and isolating antibiotic acmimycin from the cultured broth.

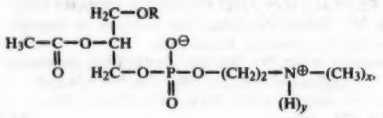
3. A process according to claim 2, wherein the acmimycin-producing microorganism is Streptomyces sp. AC4559 FERM P-6645.

## 4,517,297
## METHOD FOR THE PREPARATION OF PHYSIOLOGICAL EFFECTORS

Toshio Muramatsu; Nagao Totani, both of Chiba, Japan, and Helmut K. Mangold, Muenster, Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

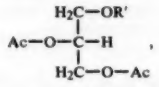
Continuation of Ser. No. 400,871, Jul. 22, 1982, abandoned. This application Apr. 30, 1984, Ser. No. 605,981
Claims priority, application Fed. Rep. of Germany, Aug. 8, 1981, 3131524
Int. Cl.[3] C12P *13/00;* C07F *9/08*
U.S. Cl. 435—128 18 Claims

1. A method for making a compound of the formula

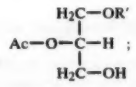


wherein R is alkyl or alkenyl, x is 1, 2, or 3, y is 0, 1, or 2, and (x+y) is 3, which method comprises

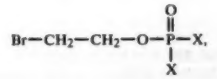
partially deacylating a starting compound of the formula



wherein R′ is alkyl or alkenyl and Ac is fatty acid acyl, to form a first intermediate of the formula



reacting said first intermediate with a bromoethylphosphoric acid halide of the formula

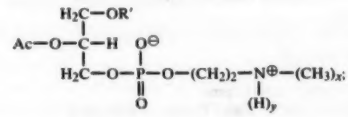


wherein X is bromine or chlorine, to form a second intermediate;

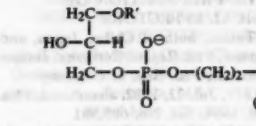
reacting said second intermediate with an amine of the formula

$(H)_yN(CH_3)_x$

to form a third intermediate of the formula



hydrolyzing said third intermediate to form a fourth intermediate of the formula



and then acetylating said fourth intermediate to form the desired compound.

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**4,517,298**

## PROCESS FOR PRODUCING FUEL GRADE ETHANOL BY CONTINUOUS FERMENTATION, SOLVENT EXTRACTION AND ALCOHOL SEPARATION

**Daniel W. Tedder, Marietta, Ga., assignor to Georgia Tech Research Corporation, Atlanta, Ga.**

**Continuation of Ser. No. 265,328, May 8, 1981, abandoned. This application Sep. 21, 1983, Ser. No. 534,262**

**Int. Cl.³ C12P** *7/16, 7/06;* **C10L** *1/02*

**U.S. Cl. 435—160** **14 Claims**

1. A continuous method of preparing alcohol, comprising:

continuously fermenting with fermentation microorganisms a fermentable biomass feedstock in water in a fermentation unit, thereby forming an aqueous fermentation liquor containing alcohol;

withdrawing a sludge waste and fermentation liquor comprising microorganisms and alcohol obtained during the processing of the biomass in the processing unit;

supplying additional feedstock and microorganisms to said fermentation unit;

continuously extracting a low-level alcohol from said fermentation liquor with a chemically stable organic solvent system containing an extractant for said alcohol and a hydrocarbon solvent for said extractant, said hydrocarbon solvent having ten or more carbons in its atom, thereby forming an alcohol-organic solvent extract phase and an aqueous raffinate;

separating said alcohol from said alcohol-organic solvent phase;

wherein said low-level alcohol-organic solvent extract phase from the fermentation liquor is such that the alcohol content in the remaining fermentation liquor is maintained sufficiently low so that it does not destroy the microorganisms in the fermentation liquor; and

returning all material components of said aqueous raffinate comprising microorganisms and unextracted alcohol to said fermentation unit.

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**4,517,299**

## ACETYLESTERASES

**Hiroshi Imanaka, Osaka; Toshio Miyoshi, Fuji; Toshio Konomi, Tsushima; Yoshiaki Kubochi; Seiziro Hattori, both of Aichi, and Takeshi Kawakita, Tsu, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

**Division of Ser. No. 283,962, Jul. 16, 1981, Pat. No. 4,414,328. This application Jun. 3, 1983, Ser. No. 500,883**

**Claims priority, application United Kingdom, Jul. 21, 1980, 8023834**

**Int. Cl.³ C12N** *9/18*

**U.S. Cl. 435—197** **1 Claim**

1. An acetylesterase obtainable from *Aureobasidium pullulans* IFO 4466 selected from acetylesterase 4466-I having the properties of

(a) Capability of hydrolyzing Cephalosporin C to deacetylcephalosporin C

(b) Substrate Specificity

Hydrolyzable: Acetic ester

Not Hydrolyzable: Ester besides acetic ester

(c) Optimum pH: Below pH 4

(d) Stable pH range: pH 4.0–6.0

(e) Optimum temperature: Around 37° C.

(f) Stable temperature range: Below 60° C.

(g) Km value: 11.5 mM and

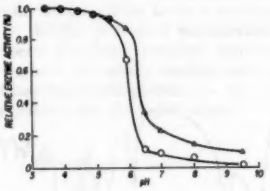
(h) Effect of metal ion: the enzyme activity is not affected by a metal ion selected from $Cu^{2+}$, $Mn^{2+}$, $Mg^{2+}$, $Zn^{2+}$, $Ni^{2+}$, $Ca^{2+}$, $Ba^{2+}$ and $Fe^{3+}$,

provided that the substrate is cephalosporin C in the above (c)–(h), and Acetylesterase 4466-II having the properties of

(a) Capability of hydrolyzing cephalosporin C to deacetylcephalosporin C

(b) Substrate Specificity

Hydrolyzable: Acetic ester




Not Hydrolyzable: Ester besides acetic ester

(c) Optimum pH: Below pH 4

(d) Stable pH range: pH 4.0–6.0

(e) Optimum temperature: Around 37° C.

(f) Stable temperature range: Below 60° C.

(g) Km value: 13.7 mM and

(h) Effect of metal ion: The enzyme activity is not affected by a metal ion selected from $Cu^{2+}$, $Mn^{2+}$, $Mg^{2+}$, $Zn^{2+}$, $Ni^{2+}$, $Ca^{2+}$, $Ba^{2+}$ and $Fe^{3+}$,

provided that the substrate is cephalosporin C in the above (c)–(h).

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**4,517,300**

## PLASMID PSAN 181

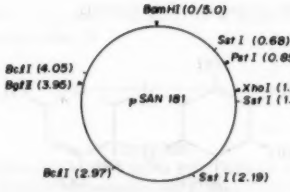
**Taichi Manome; Toshinori Ohmine; Takao Okazaki, and Mamoru Arai, all of Hiromachi, Japan, assignors to Sankyo Company, Limited, Tokyo, Japan**

**Filed Mar. 14, 1983, Ser. No. 475,245**

**Claims priority, application Japan, Mar. 16, 1982, 57-41227**

**Int. Cl.³ C12N** *1/00, 15/00;* **C12P** *19/34*

**U.S. Cl. 435—317** **2 Claims**



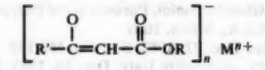

1. Isolated plasmid pSAN 181 having a molecular weight of 5±0.2 megadaltons and having single cleavage sites for each of the restriction endonucleases BamHI, PstI, XhoI and BglII, the positions of said cleavage sites being 0, about 0.85, about 1.15 and about 3.95, and multiple cleavage sites for the restriction endonuclease BclI at about 2.97 and 4.05 and for the restriction endonuclease SstI at about 0.68, 1.28 and 2.19 megadaltons, respectively, from the cleavage site of BamHI.

## 4,517,301
## KETONE CONTROL TEST COMPOSITION, METHOD AND TEST DEVICE

Carmine M. Greene, Mishawaka, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Dec. 6, 1982, Ser. No. 447,321
Int. Cl.³ G01N *33/48*
U.S. Cl. 436—14 18 Claims

1. A stable composition useful for preparing a ketone control solution, said composition comprising dimethylformamide and a predetermined quantity of a β-keto ester salt capable of being hydrolyzed in aqueous solution to a β-keto acid and having the formula

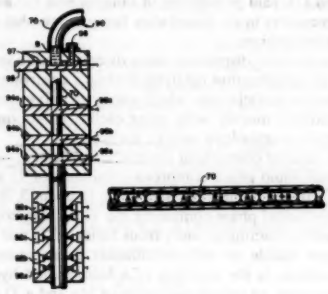


in which R is lower alkyl of 1 to 6 carbon atoms, R′ is an aliphatic group having 1 to 7 carbon atoms or cyclic group, M is a Group I, II or III metal ion and n is 1, 2 or 3.

## 4,517,302
## CONTINUOUS FLOW METERING APPARATUS

Stephen Saros, Wantagh, N.Y., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Nov. 15, 1982, Ser. No. 441,720
Int. Cl.³ G01N *1/14, 35/08*
U.S. Cl. 436—180 23 Claims



1. A method for metering the introduction of a sequence of fluid segments into a conduit, which method comprises:

sensing a flow parameter of an alternating sequence of gas and liquid stream segments along a conduit; and

stopping stream introduction along a conduit downstream of and in response to sensing of a flow parameter by selected ones of a series of flow stopping valves, each of which intersects a preceding gas segment at a different position during passage along said conduit.

14. An apparatus for metering the introduction of a sequence of fluid segments into a conduit having an inlet, which apparatus comprises;

means defining a conduit having an inlet means;

a series of sensing means disposed along said conduit for sensing a flow parameter of an alternating sequence of gas and liquid stream segments; and

a series of flow stopping means for stopping stream introduction of a sequence of fluid segments into said conduit, said flow stopping means being disposed at different locations along and within said conduit downstream of and individually responsive to sensing of said flow parameter by selected ones of said sensing means, which flow stopping means each intersect a preceding gas segment at a different position during passage along said conduit.

## 4,517,303
## SPECIFIC BINDING ASSAYS UTILIZING ANALYTE-CYTOLYSIN CONJUGATES

J. William Freytag, Wilmington, and William J. Litchfield, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 20, 1982, Ser. No. 435,455
Int. Cl.³ G01N *33/54, 33/50, 33/74*
U.S. Cl. 436—501 40 Claims

1. A conjugate for the detection of an analyte in a test sample, comprising in combination:

(1) cytolysin means for altering the permeability of a membrane of a vesicle, said means being conjugated to

(2) at least one analyte molecule.

15. A method for determining the amount of an analyte in liquid medium comprising the steps of:

(A) forming a reaction system by contacting said liquid medium with

(1) analyte specific binding agent;

(2) analyte-cytolysin conjugate; and

(3) vesicles containing marker material sequestered within the vesicle

in proportions such that the interaction of unbound analyte-cytolysin conjugate with said vesicles results in the release of said marker material; and

(B) measuring said marker material thereby released which is related to the amount of said analyte initially present in said liquid medium.

16. The method of claim 15 wherein the analyte is a drug, metabolite, hormone, steroid, pesticide, environmental pollutant, food toxin, vitamin, protein, microbial surface marker, cancer cell marker, fungus, protozoan, virus, cell or tissue antigen.

## 4,517,304
## PRODUCTION OF VIRAL ANTIGENS

Edward J. Stott; Lewis H. Thomas, and Norma J. Jebbett, all of Newbury, England, assignors to National Research Development Corporation, London, England

Filed Jun. 29, 1981, Ser. No. 278,052
Claims priority, application United Kingdom, Jul. 1, 1980, 8021434
Int. Cl.³ G01N *33/54;* C12N *5/00;* C12Q *1/29;* C12P *1/00*
U.S. Cl. 436—518 17 Claims

1. A process of producing a cell strain useful in the production of antigen(s) specific to respiratory syncytial virus, which process comprises:

(1) culturing in vitro cells derived from a human or animal respiratory tract mucosa,

(2) inoculating the cultured cells with respiratory syncytial virus, and

(3) selecting virally infected cells from the culture.

9. A method of diagnosing respiratory syncytial virus infection by detecting antibody to that virus in a biological sample taken from a human or animal, which method comprises utilizing cells of a cell strain as claimed in claim 1 in an immunological diagnostic method.

4,517,305

## FINELY DIVIDED SILICON CARBIDE HAVING A HIGH CONTENT OF 2H-TYPE SILICON CARBIDE AND METHOD OF PRODUCING THE SAME

Hiroshige Suzuki, No. 39-9, 2-Chome, Kitasenzuku, Ohta-Ku, Tokyo, Japan, and Teizo Hase, Tokyo, Japan, assignors to Hiroshige Suzuki, Japan

Continuation of Ser. No. 299,929, Sep. 8, 1981, abandoned, which is a continuation of Ser. No. 154,215, May 29, 1980, abandoned, which is a continuation of Ser. No. 18,632, Mar. 8, 1979, abandoned. This application Sep. 30, 1982, Ser. No. 428,627

Claims priority, application Japan, Mar. 15, 1978, 53-28597; Mar. 15, 1978, 53-28598; Mar. 15, 1978, 53-28600

Int. Cl.³ C01B *31/36;* C04B *35/56*

U.S. Cl. 501—89 12 Claims

5. Finely divided submicron silicon carbide powder consisting essentially of at least 10% by weight of 2H-type silicon carbide; aluminum, present in an effective amount for sintering from 0.3 to 4.9% by weight, said aluminum being homogeneously dispersed in said submicron silicon carbide powder, said submicron silicon carbide powder having a specific surface area of at least 5 $m^2/g$, and the remainder of said powder being $\beta$-type silicon carbide, the submicron silicon carbide powder being made by a method comprising reacting a mixture of carbon powders consisting of finely divided particles or an organic compound which is converted into finely divided carbon by heating, with a silicon source selected from the group of sources consisting of silicon, silicon monoxide, silicon dioxide and silicon compounds which are converted into silicon, silicon monoxide or silicon dioxide by heating, said reacting occurring at a temperature of 1,200°–1,500° C. under a reduced pressure having a vacuum degree of not lower than 10 mm Hg in the presence of metallic aluminum or an organic or an inorganic aluminum compound which is converted into aluminum by heating, said metallic aluminum or aluminum compound being dispersed homogeneously in said mixture, the amount of said metallic aluminum or aluminum compound calculated as aluminum, being 1–20 parts by weight based on 100 parts by weight of silicon carbide to be formed.

6. Finely divided submicron silicon carbide powder consisting essentially of at least 10% by weight of 2H-type silicon carbide; aluminum, present in an effective amount for sintering from 0.3–4.9% by weight, said aluminum being homogeneously dispersed in said submicron silicon carbide powder and the remainder being $\beta$-type silicon carbide, said submicron silicon carbide powder having a specific surface area of at least 5 $m^2/g$ made by a method comprising either reacting a mixture consisting essentially of vapors of a silicon halide and a hydrocarbon or decomposing trichloromethylsilane vapors, said reacting and said decomposing occurring at a temperature of 1,200°–1,500° C. in the presence of a vapor of aluminum halide dispersed homogeneously in said vapors, the amount of said aluminum halide being 0.5–5 parts by weight, calculated as aluminum, based on 100 parts by weight of silicon carbide to be formed.

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4,517,306

## COMPOSITION AND A METHOD FOR ITS USE IN DEHYDROCYCLIZATION OF ALKANES

Waldeen C. Buss, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 344,571, Feb. 1, 1982, Pat. No. 4,447,316. This application Jan. 3, 1984, Ser. No. 567,834

Int. Cl.³ B01J *29/12*

U.S. Cl. 502—74 7 Claims

1. A composition comprising:

(a) a type L zeolite;

(b) at least one Group VIII metal; and

(c) an alkalline earth metal selected from the group consisting of barium, strontium and calcium, wherein said compositon is reduced in a hydrogen atmosphere at a temperature of from 480° C. to 620° C.

5. A composition consisting essentially of:

(a) a type L zeolite;

(b) an inorganic oxide binder;

(c) platinum; and

(d) barium; wherein said composition is reduced in a hydrogen atmosphere at a temperature of from 480° C. to 620° C.

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4,517,307

## CATALYST COMPONENTS FOR THE POLYMERIZATION OF ETHYLENE AND OF MIXTURES THEREOF WITH OLEFINS AND CATALYSTS OBTAINED THEREFROM

Illaro Cuffiani, Ferrara; Paolo Longi, Milan; Umberto Zucchini, Ferrara, and Gianni Pennini, Porotto, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Dec. 22, 1982, Ser. No. 452,152

Claims priority, application Italy, Dec. 24, 1981, 25840 A/81

Int. Cl.³ C08F *4/62, 4/64, 4/68*

U.S. Cl. 502—119 14 Claims

1. An emulsion or dispersion, in an inert liquid medium or in an inert gas phase of a liquid phase, of a catalyst component selected from the group consisting of

(1) compounds of transition metals of Groups IV to VI, inclusive, of the Mendelyeev Periodic System and which, in the liquid state, are immiscible in aliphatic hydrocarbons;

(2) compositions comprising transition metal compounds of the Groups indicated in (1) above and which, in the liquid state, are immiscible in aliphatic hydrocarbons; and

(3) transformation products of precursors of components (1) and (2), said precursors in the liquid state being immiscible in aliphatic hydrocarbons;

said emulsion or dispersion being directly usable in the preparation of coordination catalysts having a controlled morphology and/or particle size, which catalysts polymerize ethylene and mixtures thereof with other olefins to polymers having controlled morphology and/or particle size.

3. A catalyst component according to claim 1, in which the dispersed liquid phase comprises compunds of Ti and Mg.

4. A catalyst component according to claim 3, in which the dispersed liquid phase containing the Ti and Mg compounds is obtained by reacting an anhydrous halide of Ti and Mg and an aluminum halide or alkyl-Al-dihalide in an aromatic liquid hydrocarbon, in the presence of a halogenated hydrocarbon, or by reacting an anhydrous halide of Mg and a Ti alcoholate, in the presence of an anhydrous hydrohalogenic acid.

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4,517,308

## METHOD OF PRODUCING A SORPTIVE BODY, PARTICULARLY FOR ELIMINATING ODORS, AIR FRESHENING, ETC. AND THE RESULTANT PRODUCT

Peter Ehlenz, Königswinter, and Lutz Irgel, St. Augustin, both of Fed. Rep. of Germany, assignors to Collo GmbH, Bornheim-Hersel, Fed. Rep. of Germany

Filed Aug. 31, 1982, Ser. No. 413,310

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1981, 3135025

Int. Cl.³ B29D *27/00;* B01J *20/10, 20/20, 20/30*

U.S. Cl. 502—401 21 Claims

1. In a method of producing a sorptive body for use in filtering air and/or in eliminating odors, providing air freshening, and the like, in which finely ground solid particles of a sorptive substance or a composition containing a sorptive substance are mixed with a binding agent and are thereby bound into a cohesive body, the improvement comprising:

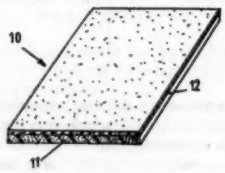
combining said finely ground solid particles with at least one liquid sorbate before mixing said solid particles with a binding agent, said solid particles having pores and capillaries for absorbing said sorbate, said sorbate being absorbable in said pores and capillaries, and the conditions of said

combining being such that said sorbate is absorbed in said capillaries and pores;

mixing said combined solid particles and absorbed sorbate with a binding agent comprising a settable binder composition in a liquid solvent, said binder composition being settable upon evaporation of said liquid solvent at a temperature higher than the boiling point of said sorbate so as to bind said solid particles together as a cohesive sorptive body;

shaping said mixture and/or applying said mixture to a carrier body so as to form a cohesive sorptive body for use in filtering air and/or in eliminating odors, providing air freshening and the like; and,

applying heat to said shaped and/or supported mixture so as to cause evaporation of said liquid solvent from said mix-




ture, setting of said binder composition so as to bind said solid particles together in said cohesive sorptive body, and expulsion of said sorbate from said solid particles during the setting of said binder composition, the amount of said binder composition not exceeding 30% of the weight of said sorptive substance and the amount of said sorbate expelled from said solid particles during setting of said binder composition providing a connected open system of pores and capillaries in said binder composition for passage of air through said cohesive body and contact of said air with said sorptive substance.

**18**. The product made by the method of claim **1** to produce a filter mat and/or an air purifier, especially in kitchen extractor-hoods, air-conditioning devices, wherein the granular sorptive body, e.g. active carbon, taken up in the binding agent is fastened to a carrier (**11**, **14**), e.g. a fibrous fleece, foam strip.

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## 4,517,309
## METHOD FOR THE TREATMENT OF CALCIFYING PANCREATITIS

**Aiji Noda, 204-402, No. 2-3, Fujiyamadai 2-chome, Kasugai-shi, Aichi-ken, Japan**

**Filed Feb. 1, 1984, Ser. No. 575,897**
**Claims priority, application Japan, Apr. 6, 1983, 58-61666**
**Int. Cl.³ A61K** *31/42*
**U.S. Cl. 514—376** **5 Claims**

**1**. A method for the treatment of calcifying pancreatitis which comprises orally administering trimethadione in a dose of 0.5 to 3 g/day at least for one month to a patient suffering from calcifying pancreatitis to thereby dissolve pancreatic stones.

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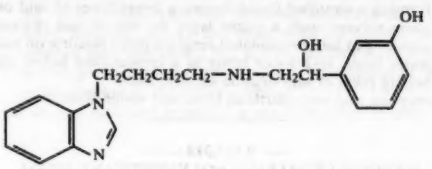
## 4,517,310
## N-[2-HYDROXY-2-(3-HYDROXYPHENYL)ETHYL]-1H-BENZIMIDAZOLE-1-BUTANAMINE AND USE THEREOF AS A CARDIOTONIC AGENT

**Julius Diamond, Mountain Lakes, and Ronald A. Wohl, Morris Plains, both of N.J., assignors to Berlex Laboratories, Inc., Cedar Knolls, N.J.**

**Filed Jul. 28, 1981, Ser. No. 287,605**
**Int. Cl.³ A61K** *31/415;* **C07D** *235/06*
**U.S. Cl. 514—394** **7 Claims**

**1**. A compound of the formula:




or a pharmaceutically acceptable acid addition salt thereof.

**5**. The method of eliciting a cardiotonic effect in a mammalian host having a disease condition in which therapeutic benefit is derived from elicitation of a cardiotonic effect, which comprises administering to said host a non-toxic cardiotonically effective amount of a compound of claim **1**.

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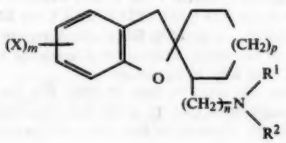
## 4,517,311
## 2'-SUBSTITUTED-SPIRO[BENZOFURAN-2(3H),1'-CYCLOALKANES] AND THEIR ANALGESIC AND ANTI-DEPRESSANT COMPOSITIONS

**Edward J. Glamkowski, Warren, N.J.; Michael C. Jones, deceased, late of Somerville, N.J., and by Herbert Jones, administrator, Montague, Mich., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Continuation-in-part of Ser. No. 313,097, Oct. 19, 1981, Pat. No. 4,404,221. This application Sep. 13, 1982, Ser. No. 416,446**
**The portion of the term of this patent subsequent to Sep. 13, 2000, has been disclaimed.**
**Int. Cl.³ A61K** *31/34;* **C07D** *307/94*
**U.S. Cl. 514—462** **14 Claims**

**1**. A compound of the formula




wherein X is hydrogen, halogen, amino, alkyl-substituted amino, hydroxy, alkyl, and alkoxy, halogen being any of fluorine, chlorine, bromine and iodine; m is an integer of 1, 2, or 3, X being the same or different when m is larger than 1; n is an integer of 0, 1 or 2; p is an integer of 0 or 2 and $R^1$ and $R^2$ are each independently hydrogen and alkyl; a stereoisomer thereof and a pharmaceutically acceptable acid addition salt of any of the foregoing.

**7**. A method of treatment which comprises administering to a depressed patient a pharmaceutically effective amount of a compound defined in claim **1**.

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## 4,517,312
## PROCESS FOR REGENERATING RESIN

**Sadao Kumasaka; Satomi Tada, both of Tokyo; Shigeo Horikoshi; Tamaki Kamanaka, both of Kawagoe, and Hiroshi Taniguchi, Tokyo, all of Japan, assignors to Toyo Rubber Chemical Industry Co., Ltd., Tokyo, Japan**

**Filed Dec. 19, 1983, Ser. No. 563,644**
**Claims priority, application Japan, Dec. 23, 1982, 57-229202**
**Int. Cl.³ C08J** *11/04*
**U.S. Cl. 521—47** **3 Claims**

**1**. A process for regenerating a resin from substantially water insoluble waste resin which has a lower specific gravity than water, comprising:

dissolving such a waste resin in an organic solvent which is immiscible with water and which has a larger specific gravity than water to provide a resin solution;

admixing water with said resin solution thereby precipitating

the resin in the solution in the form of resin particles and forming a stratified liquid having a lower layer of said organic solvent with a water layer on top of said organic solvent and said precipitated resin particles floating on said water layer, said water being at a temperature below the boiling point of said organic solvent; and

recovering said resin particles from said water layer.

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**4,517,313**

## METHOD OF MAKING POLYURETHANE FOAM

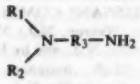
**Keiichi Nakatani, Kyoto, Japan, assignor to Abbott Laboratories, North Chicago, Ill.**

**Filed Apr. 11, 1984, Ser. No. 598,776**

**Int. Cl.³ C08G *18/14, 18/18, 18/20***

**U.S. Cl. 521—51** **4 Claims**

1. In a method of manufacturing polyurethane foam by reacting organic polyisocyanates and polyols in the presence of a foaming agent, a catalyst, and the like, the improvement comprising employing as the catalyst, a salt of carbonic acid and a polyamine represented by the general formula:



wherein $R_1$ and $R_2$ are an alkyl group having 1–4 carbon atoms or $R_1$ and $R_2$ are combined to form a heterocyclic ring having 3–6 carbon atoms together with the nitrogen atom; and $R_3$ is an alkylene group.

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**4,517,314**

## FINE PARTICULATE, EXPANDABLE STYRENE POLYMERS SUITABLE FOR THE PRODUCTION OF RAPIDLY MOLD-EJECTED CELLULAR BODIES

**Dirk Reese, Marl, and Josef K. Rigler, Recklinghausen, both of Fed. Rep. of Germany, assignors to Chemische Werke Hüls AG, Marl, Fed. Rep. of Germany**

**Division of Ser. No. 621,270, Jun. 18, 1984, Pat. No. 4,497,912. This application Oct. 17, 1984, Ser. No. 661,811**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1983, 3325392**

**Int. Cl.³ C08V *9/20***

**U.S. Cl. 521—59** **7 Claims**

1. In a particulate molding composition for the production of foamed articles consisting essentially of a mixture of an expanding agent, a polymerized reaction product of styrene monomer or styrene monomer in admixture with comonomers, and a water insoluble compound of high molecular weight which is soluble in the monomers and forms a non continuous phase with the styrene polymers,

the improvement comprising said high molecular weight compound comprising about 0.01 to 2.0 percent by weight of a polyoctenamer based on the weight of said monomers and comonomers.

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**4,517,315**

## PRODUCTION OF A FILM-LIKE OR FIBROUS STRUCTURE OF AN AROMATIC POLYESTER

**Shunichi Matsumura, Hachioji, and Hiroo Inata, Hino, both of Japan, assignors to Teijin Limited, Osaka, Japan**

**Filed Jan. 18, 1982, Ser. No. 340,036**

**Claims priority, application Japan, Jan. 27, 1981, 56-9606; Jan. 30, 1981, 56-11547; Sep. 18, 1981, 56-146199**

**The portion of the term of this patent subsequent to Dec. 6, 2000, has been disclaimed.**

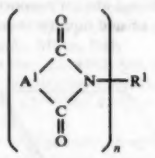
**Int. Cl.³ B29D *27/00*; C08G *8/00***

**U.S. Cl. 521—64** **25 Claims**

1. A process for producing a film-like or fibrous structure of an aromatic polyester which does not contain pores which open to both surfaces, which comprises

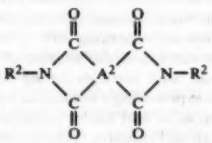
(1) forming an unstretched film-like or fibrous structure by melt-shaping a blend comprising 100 parts by weight of (A) an aromatic polyester having a high degree of polymerization and containing an aromatic dicarboxylic acid as a main acid component and an aliphatic diol and/or an alicyclic diol as a main glycol component and (B) 3 to 300 parts by weight of a low-molecular-weight compound being substantially non-reactive with the aromatic polyester (A) and having a boiling point of at least about 200° C. under atmospheric pressure and a molecular weight of not more than 1,000 and being a compound selected from the group consisting of imide compounds of the formula (1)-a

(1)-a



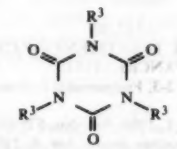
wherein $A^1$ represents a divalent aromatic group or linear or cyclic aliphatic group which may be substituted $R^1$ represents an aromatic group or linear or cyclic aliphatic group having a valence of n; n is 1 or 2; and the imide ring is 5- or 6-membered, imide compounds of the following formula (1)-b

(1)-b



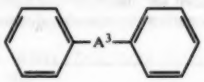
wherein $A^2$ represents a tetravalent aromatic group which may be substituted, $R^2$ represents a monovalent linear or cyclic aliphatic group which may be substituted, and the imide rings are 5- or 6-membered, trialkylisocyanurates of the formula (1)-c

(1)-c



wherein $R^3$ represents a monovalent alkyl group, diphenyl compounds of the formula (1)-d

(1)-d



wherein $A^3$ represents —O—, —$SO_2$—, —CO—, or an alkylene group, and the phenyl rings may be substituted, nitrobenzene, nitrotoluene, and nitronaphthalene,

(2) stretching the resulting film-like or fibrous structure, the stretching ratio being from about 3 to about 7 in the case of the fibrous structure and from about 3 to about 30 in terms of area ratio in the case of the film-like structure, and

(3) extracting at least a major portion of the low-molecular-weight compound from the stretched film-like or fibrous

structure by using an organic solvent which does not substantially dissolve the aromatic polyester under the extracting conditions.

25. A film-like or fibrous structure of an aromatic polyester, prepared by the process of claim 1, said structure substantially containing no low-molecular-weight compound or containing the low-molecular-weight compound in an amount of up to about 1 part by weight at most per 100 parts by weight of the aromatic polyester.

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## 4,517,316
## POROUS IRRIGATION PIPE PREPARED FROM PARTICULATE ELASTOMER AND THERMOPLASTIC BINDER CONTAINING CONTROLLED MOISTURE CONTENT

**James W. Mason, Huntington Beach, Calif., assignor to Dasurat Enterprises PTE Ltd., Singapore**

**Filed Jan. 24, 1984, Ser. No. 573,497**
**Int. Cl.³ A01G *27/00***
**U.S. Cl. 521—81** **19 Claims**

1. An extrudable composition having a controlled moisture content from 0.5 to 3 percent by weight and formed from a mixture consisting essentially of:
100 parts by weight of particulate elastomer;
10 to 60 phr of a thermoplastic binder;
1.0 t0 6.0 phr of a slip agent; and
0.1 to 1.0 phr of a lubricant.

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## 4,517,317
## POLYMER COMPOSITION

**Selichi Tada, Ichihara, Japan, assignor to Du Pont-Mitsui Polychemicals Co., Ltd., Tokyo, Japan**

**Filed Jul. 17, 1984, Ser. No. 631,835**
**Claims priority, application Japan, Jul. 22, 1983, 58-133940; Jul. 22, 1983, 58-133941; Nov. 8, 1983, 58-209537**
**Int. Cl.³ C08J *9/10***
**U.S. Cl. 521—95** **13 Claims**

1. A foamable polymer composition comprising an ethylene-vinyl acetate-carbon monoxide copolymer, a heat-decomposable organic blowing agent having a decomposition temperature of at least 90° C., and an epoxy compound selected from the group consisting of a nitrogen-containing epoxy compound and an alicyclic epoxy compound.

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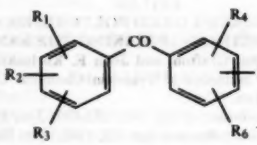
## 4,517,318
## PHOTO-DEGRADABLE STYRENE RESIN COMPOSITIONS

**Hiroshi Miyoshi, Takatsuki; Hirohumi Mori, Suita, and Yoriko Tanoue, Suita, all of Japan, assignors to Sekisu Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 153,013, Jun. 14, 1971, abandoned. This application Sep. 9, 1974, Ser. No. 504,160**
**Claims priority, application Japan, Sep. 18, 1970, 45-82135; Sep. 19, 1970, 45-82381; Dec. 4, 1970, 45-107896; Dec. 28, 1970, 45-126948**
**Int. Cl.³ C08F *8/00***
**U.S. Cl. 523—126** **40 Claims**

1. A photo-degradable styrene resin composition which comprises a styrene resin and, incorporated therein, at least one photo-degradable agent selected from compounds of the following formula




wherein
$R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$, which may be the same or different, represent a member selected from the group consisting of hydrogen, chlorine, bromine, hydroxyl, methyl, ethyl, methoxy, ethoxy and nitro; with the proviso that when at least one of $R_1$, $R_2$, $R_3$, $R_4$, $R_5$ and $R_6$ is a hydroxyl group, said hydroxyl group is not present at the ortho-position to the —CO— group,
in an amount sufficient to exhibit a photo-degradative effect.

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## 4,517,319
## TOUGHENED POLYOXYMETHYLENE AND SHAPED ARTICLES PRODUCED THEREFROM

**Eckart Reske, Hofheim am Taunus, and Ernst Wolters, Königstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Filed Feb. 2, 1984, Ser. No. 576,115**
**Claims priority, application Fed. Rep. of Germany, Feb. 4, 1983, 3303760**
**Int. Cl.³ C08K *9/02, 3/10*; C08L *59/00, 75/04***
**U.S. Cl. 523—200** **10 Claims**

1. A mixture consisting essentially of a polyoxymethylene, a polyurethane and a filler, wherein the polyurethane has a Shore hardness A of not more than 90 and the filler has an average particle size less than 10 μm, and wherein the composition of the mixture is given by the equations

$$P_1 = 100 - (P_2 + P_3)$$

$$P_2 = \frac{100\,\rho_2\,(1-a)\,b}{\rho_1\,(1-b) + \rho_2\,(1-a)\,b + \rho_3\,a\,b}$$

$$P_3 = \frac{P_2\,\rho_3\,a}{\rho_2\,(1-a)}$$

in which the symbols have the following meaning:
$P_1$ = % by weight of polyoxymethylene
$P_2$ = % by weight of polyurethane
$P_3$ = % by weight of filler
$\rho_1$ = density of the polyoxymethylene in $g.cm^{-3}$ $\rho_2$ = density of the polyurethane in $g.cm^{-3}$
$\rho_3$ = density of the filler material in $g.cm^{-3}$
a = a numerical value between 0 and 0.4,
b = a numerical value between 0.03 and 0.55, and
$P_3$ is at least 0.5.

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## 4,517,320
## STOVING LACQUERS CONTAINING GRAPHITE

**Fridolin Bäbler, Marly, Switzerland, and Adolf Weissmüller, Kandern, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Aug. 8, 1983, Ser. No. 520,931**
**Claims priority, application Switzerland, Aug. 20, 1982, 4981/82**
**Int. Cl.³ C08K *3/04***
**U.S. Cl. 523—215** **12 Claims**

1. A stoving-lacquer, which after stoving gives a coating having a thickness of 3–60 μm and with a metallic effect having a fine, uniform gleaming lustre, which consists essentially of
(a) a thermoset acrylic resin, a thermoset alkyd resin, an epoxy resin, a phenolic resin, melamine resin, urea resin, polyester, benzoguanamine resin, cellulose ester resin or combinations thereof,
(b) 0.001 to 30% by weight, relative to the dry lacquer coating, of one or more organic pigments or polymer-soluble dyes, and
(c) 0.001 to 30% by weight, relative to the dry lacquer coating, of graphite with a particle diameter of less than 100 microns.

4,517,321

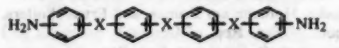
## PREIMPREGNATED REINFORCEMENTS AND HIGH STRENGTH COMPOSITES THEREFROM

Hugh C. Gardner, Somerville; Michael J. Michno, Jr., and George L. Brode, both of Bridgewater, all of N.J., assignors to Union Carbide Corporation, Danbury, Conn.

Filed May 20, 1983, Ser. No. 496,504
Int. Cl.³ C08K 7/02, 7/10, 7/14; C08L 63/00
U.S. Cl. 523—400 37 Claims

1. A composition comprising:

(a) a diamine hardener represented by the following general formula:



wherein the X's are independently selected from a direct bond, O, S, $SO_2$, CO, COO, $C(CF_3)_2$ and $C(R_1R_2)_2$ wherein $R_1$ and $R_2$ are independently hydrogen or alkyl of 1 to 4 carbon atoms,

(b) an epoxy resin containing two or more 1,2-epoxide groups per molecule, and

(c) a structural fiber having a tensile strength of greater than 100,000 psi, a tensile modulus of greater than two million psi and a decomposition temperature of greater than 200° C.

4,517,322

## ACRYLATED ALKYD AND POLYESTER RESINS

William J. Birkmeyer, Oakmont; Ralph C. Gray, Allison Park; Rostyslaw Dowbenko; David C. Kapp, both of Gibsonia; Elior J. VanBuskirk, and Rudolf Maska, both of Pittsburgh, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 22, 1983, Ser. No. 534,916
Int. Cl.³ C09D 3/66, 3/68
U.S. Cl. 523—501 12 Claims

1. A non-gelled resin formed by reacting:

(a) an ethylenically unsaturated polyester having an ethylenically unsaturated component which contains two carboxylic acid moieties with

(b) ethylenically unsaturated monomers which include an ethylenically unsaturated acid, said resin being dispersed with base in aqueous medium.

4,517,323

## MOLDED PRODUCTS

Larry W. Ferguson, and Roger A. McFarland, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jul. 20, 1981, Ser. No. 284,440
Int. Cl.³ B29D 3/02; B32B 7/00, 5/16, 31/04
U.S. Cl. 523—514 9 Claims

1. A method for producing a molded object comprising an appearance surface and a reinforcing surface which comprises incorporating in the appearance surface an amount of unsaturated polymeric resin equal to from about 40 to about 50 volume percent of the total volume of the appearance surface, a volume of glass fibers equal to from about 28 to about 30 volume percent of the total volume of the appearance surface, a volume of filler equal to from about 28 to about 30 volume percent of the total volume of the appearance surface, the amount of glass fibers equal to from about 35 to about 42 weight percent of the total weight of the components comprising the appearance surface and incorporating in the reinforcing surface an amount of unsaturated polymeric resin equal to from about 40 to about 43 volume percent of the total volume of the reinforcing surface, a volume of glass equal to from about 16 to about 20 volume percent of the total volume of reinforcing surface, a volume of filler equal to from about 34 to about 40 volume percent of the total volume of the reinforcing surface, the amount of glass equal to from about 22 to about 28 weight percent of the total weight of the components comprising the reinforcing surface.

9. A molded object produced by the method of claim 1.

4,517,324

## VISCOUS CELLULOSE-CONTAINING MIXTURE (PASTE) AND A PROCESS FOR THE PRODUCTION OF AQUEOUS COATING EMULSIONS THEREFROM

Erhard Lühmann, Bomlitz; Lutz Hoppe; Klaus Szablikowski, both of Walsrode, and Friedrich-Karl Lampert, Bomlitz, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 30, 1982, Ser. No. 429,469
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1981, 3139840
Int. Cl.³ C09D 3/12; C08L 1/00
U.S. Cl. 524—27 11 Claims

1. A stable aqueous coating emulsion based on a viscous cellulose-containing mixture or paste, comprising:

(a) from 5.0 to 60% by weight of a cellulose substance,

(b) from 0.0 to 55% by weight of at least one resin,

(c) from 0.5 to 55% by weight of at least one ethoxylated plasticiser,

(d) from 0.0 to 20% by weight of at least one emulsifier,

(e) from 0.0 to 25% by weight of at least one organic solvent,

(f) from 0.0 to 30% by weight of water,

the sum of (a) to (f) always must amount to 100% by weight, and the ratio of solids to organic solvent phase is greater than or equal to 1.

4,517,325

## CORROSION RESISTANT CORE-PLATE AND COATINGS THEREFOR

Bruno M. Perfetti, Jeannette, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Oct. 13, 1983, Ser. No. 541,613
Int. Cl.³ C08K 3/10
U.S. Cl. 524—188 4 Claims

1. Composition useful for coating substrates comprising a solution or dispersion in an aqueous medium of

a. quaternary ammonium silicate of the formula $WM_2O.X(N_nR_p)_2O.Y\ SiO_2Z\ H_2O$ where W is a number from 0 to 1, X is a number from 0.33 to 1.5, Y is a number from 2 to 10, Z is a number from 1 to 20, M is an alkali metal, R is an organic radical that forms an NR base selected from alkyl, alkanol, and heterocyclic groups, each independently selected, having from 1 to 20 carbon atoms, n is an integer from 1 to 10, and p is at least 4, and

b. ethylene polymer selected from the group consisting of copolymers, terpolymers and ionomers of ethylene with acrylic, methacrylic or crotonic acids or esters thereof or vinyl acetate, wherein the portion of ethylene polymer derived from ethylene is from about 60 to about 90 weight percent, the weight ratio of $SiO_2$ derived from the quaternary ammonium silicate to ethylene polymer being from about 20:1 to about 1:20, and

c. about 0.1% to about 5%, based on the total of a and b, of a chromate selected from the group consisting of barium chromate, strontium chromate, and lead chromate.

4,517,326

## AQUEOUS LIQUID FILLED POLYURETHANE GELS AND METHOD OF MAKING THE SAME

Howard P. Cordts, Grafton, and Joan E. Karloske, Saukville, both of Wis., assignors to Freeman Chemical Corporation, Port Washington, Wis.

Continuation-in-part of Ser. No. 273,499, Jun. 15, 1981, abandoned. This application Apr. 22, 1983, Ser. No. 487,507
Int. Cl.³ C08L 75/08
U.S. Cl. 524—310 18 Claims

1. A method for producing a thermoset article having a

polyurethane elastomer continuous phase and having dispersed liquid-phase droplets as a discontinuous phase, comprising:

A. obtaining polyisocyanate prepolymer having an NCO— value of 2.5–3.0, formed from the reaction of organic di-isocyanate and organic polyether polyol, containing at least 40 percent by weight ethylene oxide adducts;

B. mixing said polyisocyanate prepolymer under reactive conditions with an aqueous reactant including 25 to 65 percent by weight water and 75 to 35 percent by weight of organic polyol, the weight of said aqueous reactant being from 3 to 20 times the weight of said polyisocyanate prepolymer;

C. after gelation of the mixture has commenced but before gelation has completed, forming the mixture into a desired shape until the mixture cures with discrete droplets of unreacted aqueous reactant homogeneously dispersed therethrough; and

D. recovering a homogeneous shaped article containing from 75 to 95 percent by weight of the said aqueous reactant.

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## 4,517,327
## LOW TEMPERATURE CURABLE COATING COMPOSITION

**John F. Heaps, Springfield, and Dennis E. Erickson, Wilbraham, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Jan. 26, 1984, Ser. No. 574,238**

**Int. Cl.³ C08J 3/10; C08L 61/32, 67/00, 29/08**

**U.S. Cl. 524—315** **16 Claims**

1. A process for preparing a coating composition which comprises:

(1) forming a solution of a water-soluble aminoplast selected from the group consisting of methoxymethyl derivatives of urea, melamine and methyl- and ethyl-guanamines and a styrene-(meth)allyl alcohol polymer in a polar solvent wherein the ratio of the aminoplast to styrene-(meth)allyl alcohol copolymer is in the range of about 3:2 to about 50:1 by weight; and

(2) adding the solution to an aqueous solution or dispersion of a hydroxyl-containing resin and mixing to obtain a uniform dispersion;

wherein the styrene-(meth)allyl alcohol copolymer has a molecular weight in the range of about 1000 to about 2500 and a hydroxyl content in the range of about 4.0 to about 10.0 weight percent and wherein the hydroxyl containing resin is selected from the group consisting of acrylic, and polyester hydroxyl-containing resins containing about 1.3–10 weight % hydroxyl and an acid number in the range of about 2 to about 12.

4. The process according to claim 1 wherein the polar solvent is selected from the group consisting of alcohols, ketones, ethers, glycol ethers and acetates.

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## 4,517,328
## MIXTURES OF SUBSTITUTED DIPHENYL ETHERS WITH AROMATIC POLYESTERS AND POLYESTER CARBONATES HAVING AN IMPROVED PROCESSIBILITY

**Manfred Schmidt, Krefeld; Dietrich Rathmann, Leverkusen, and Klaus Reinking, Wermelskirchen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 6, 1984, Ser. No. 586,742**

**Claims priority, application Fed. Rep. of Germany, Mar. 18, 1983, 3309766**

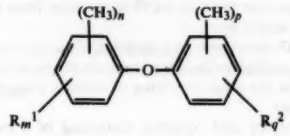
**Int. Cl.³ C08L 67/02**

**U.S. Cl. 524—370** **7 Claims**

1. A composition comprising a mixture of

A. from 95 to 99.5% by weight, based on the total of A and B, of aromatic polyesters and/or aromatic polyester carbonates based on diphenols and iso- and/or terephthalic acid, and

B. from 0.5 to 5% by weight, based on the total of A and B, of at least one compound corresponding to the formula:




(I)

wherein

$R^1$, $R^2$ represent an alkyl radical having from 2 to 24 carbon atoms,

n,m,p,q represent zero or an integer from 1 to 4, provided that the total of

m+q is at least 1, and the total of

n+m+p+q is at most 6.

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## 4,517,329
## POLYMERIC ANTITUMOR AGENT

**Edward H. Mottus, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**Continuation-in-part of Ser. No. 274,596, Jun. 17, 1981, abandoned. This application Oct. 7, 1983, Ser. No. 540,085**

**Int. Cl.³ C08K 3/16; C08F 214/02, 222/06**

**U.S. Cl. 524—401** **9 Claims**

1. An antitumor active, water-soluble composition of matter selected from the group consisting of low molecular weight copolymers of chloroethyl vinyl ether and maleic anhydride, wherein said molecular weight is less than about 3000 and wherein said copolymer is derivatized to contain half-amide, half-carboxyl acid groups in which from 0 weight percent to about 25 weight percent of the half-amide, half-carboxyl acid groups are converted to imide groups, and the pharmaceutically acceptable cationic salt derivatives of said derivatized copolymers.

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## 4,517,330
## FLOOR POLISH COMPOSITION HAVING IMPROVED DURABILITY

**Richard E. Zdanowski, Ft. Washington, and Joseph M. Owens, Hatboro, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Mar. 30, 1983, Ser. No. 480,549**

**Int. Cl.³ C08K 3/10**

**U.S. Cl. 524—408** **24 Claims**

1. A floor polish vehicle composition which yields floor polishes with improved durability and which includes an emulsion copolymer containing from about 3% to 50% by weight of residues of at least one acidic monomer, and from at least about 15% of the equivalent of the copolymer acid residues of dissolved polyvalent metal ionic crosslinking agent wherein the improvement comprises at least one basic salt of an alkali metal such that the molar ratio of the polyvalent metal ion to the alkali metal ion is from about 10:0.10 to 1.0:3.0.

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## 4,517,331
## ACTIVATING PLASTICIZER FOR URETHANE PREPOLYMERS AND COMPLEX OF ALKALI METAL SALT WITH 4,4'-METHYLENEDIANILINE

**Dane K. Parker, Massillon; Joseph A. Kuczkowski, Munroe Falls, both of Ohio, and Michael E. Kimball, West Brook, Me., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Mar. 5, 1984, Ser. No. 586,369**

**Int. Cl.³ C08G 18/32, 18/16, 18/50, 18/48**

**U.S. Cl. 524—451** **8 Claims**

1. The storable polypropylene ether polyurethane composition comprising a mixture of

(a) an equivalent of a prepolymer formed by reacting a

polypropylene ether polyol of 2 to 6 OH with sufficient organic polyisocyanate to give an excess of about 3 to 15 percent by weight of free NCO in said prepolymer with the proviso that the free NCO is obtained from methane di(phenyl isocyanate);

(b) 0.7 to 1.05 equivalents of a complex of an alkali metal salt with 4,4'-methylenedianiline, said alkali metal being selected from the class consisting of sodium, potassium and lithium; and

(c) a catalyst for said complex consisting of a crown or pseudocrown ether, said ether being composed of radicals having the structural formula $-(-y-CH_2-CH_2)_n-$ where y can be nitrogen, sulfur or oxygen and n is a number 3 to 100.

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**4,517,332**

## RUBBER COMPOSITION CONTAINING A SILICONE RAW RUBBER

**Noriaki Wada, Kobe, Japan, assignor to Japan Synthetic Rubber Co., Ltd., Tokyo and Bando Chemical Industries, Ltd., Kobe, both of, Japan**

**Filed May 12, 1983, Ser. No. 494,051**

**Claims priority, application Japan, May 16, 1982, 57-82795**

**Int. Cl.³ C08L** *7/00, 9/00, 9/02, 83/06*

**U.S. Cl. 524—506** **11 Claims**

1. A rubber composition consisting essentially of:

(1) 100 parts by weight of a rubber mixture of 98 to 80% by weight of at least one organic diene rubber selected from the group consisting of natural rubber and organic synthetic rubbers and 2 to 20% by weight of a silicone raw rubber having a molecular weight of 100,000 to 1,000,000 formed from an organopolysiloxane represented by the general formula $-R_2SiO-$, wherein R is alkyl, alkenyl, aryl, aralkyl, haloalkyl or cyanoalkyl;

(2) 0.1 to 10 parts by weight of a vulcanizing agent; and

(3) 10 to 200 parts by weight of a filler.

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**4,517,333**

## NOVEL VISCOSIFIERS FOR AQUEOUS FLUIDS BASED ON POLYMER COMPLEXES

**Robert D. Lundberg, Bridgewater; Robert R. Phillips, Spring Lake Heights, and Dennis G. Peiffer, East Brunswick, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Dec. 12, 1983, Ser. No. 560,516**

**Int. Cl.³ C08L** *33/00, 33/26, 41/00*

**U.S. Cl. 524—516** **9 Claims**

1. A polymer complex dissolved in water solution which comprises a mixture of:

(a) a copolymer of a first water soluble polymer backbone and an anionic comonomer, said, anionic comonomer being about 1 to about 50 weight percent of said copolymer; and

(b) a copolymer of a second water soluble polymer backbone and a cationic comonomer, said cationic comonomer being about 1 to about 50 weight percent of said copolymer wherein the equivalence ratio of the copolymer of the water soluble polymer backbone and cationic comonomer to the copolymer of the water soluble polymer backbone and anionic comonomer is about 30/1 to 1.1/1 or 0.9/1 to 1/30.

**4,517,334**

## POLYOL-MODIFIED ALKYD RESINS

**Hans-Christoph Wilk, Neuss; Bernd Wegemund, Haan, and Manfred Gorzinski, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany**

**Filed Dec. 15, 1983, Ser. No. 561,630**

**Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 3246616; European Pat. Off., Jul. 22, 1983, 83107207.9**

**Int. Cl.³ C08L** *67/00*

**U.S. Cl. 524—539** **21 Claims**

1. An alkyd resin mixture for use in stoving water lacquers comprising a mixture of alkyd resins containing the reaction products of polybasic carboxylic acids or reactive derivatives thereof and polyhydric alcohols, and, optionally, monofunctional modifying agents, wherein the polyhydric alcohol component thereof is at least in part one or more polyols having an average molecular weight of from about 200 to about 2000 g/mole, an average —OH functionality of >2, and at least 2 terminal next to terminal hydroxyl groups of the formula —CHR—OH wherein R is —H and/or $-CH_3$.

19. A stoving water lacquer containing the alkyl resin mixture of claim 1.

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**4,517,335**

## PROCESS FOR VULCANIZATION OR CROSS-LINKING HALOGEN CONTAINING RUBBERS IN THE PRESENCE OF SILICON CONTAINING ISOTHIURONIUM COMPOUNDS

**Siegfried Wolff, Bornheum-Merten; Heinz Grewatta, Cologne, both of Fed. Rep. of Germany, and Wolfgang Buder, Salvador-Bahia, Brazil, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

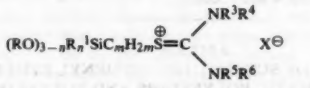
**Continuation of Ser. No. 614,170, May 25, 1984, now abandoned. This application Jun. 18, 1984, Ser. No. 621,626**

**Claims priority, application Fed. Rep. of Germany, May 27, 1983, 3319251**

**Int. Cl.³ C08J** *3/24;* **C08K** *3/34, 5/54;* **C08L** *23/28*

**U.S. Cl. 524—552** **20 Claims**

1. A vulcanizable rubber composition comprising at least one halogen containing rubber, a silicate filler, and an isothiuronium compound of the formula



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in an amount of 0.1 to 5 parts by weight based on 100 parts by weight of the halogen containing rubber, and wherein

X is chloride, bromide or iodide,

m is a number from 1 to 6,

$R^1$ is a $C_1$ to $C_5$ alkyl group, a $C_5$ or $C_6$-cycloalkyl group or the phenyl group,

R is a $C_1$ to $C_5$ alkyl group, a $C_5$ or $C_6$ cycloalkyl group, the α-methoxyethyl group, the phenyl group or the benzyl group,

n is 0, 1 or 2,

$R^3$, $R^4$, $R^5$, $R^6$ are the same or different and are hydrogen, or $C_1$–$C_5$ alkyl group, or $R^3$, $R^5$ are hydrogen and $R^4$, $R^6$ are the same or different and are hydrogen, a $C_5$–$C_6$-cycloalkyl group, the phenyl group or the benzyl group, or $R^4$ and $R^6$ together are a connected $C_2$–$C_4$ alkylene chain.

## 4,517,336
## RUBBER MIXTURES GIVING REVERSION-FREE VULCANIZATES AND PROCESS OF VULCANIZATION

Siegfried Wolff, Bornheim-Merten, and Ewe-Hong Tan, Brühl, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 92,519, Nov. 8, 1979, abandoned. This application Jun. 3, 1981, Ser. No. 270,131

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1978, 2848559

Int. Cl.[3] C08L *9/00, 83/08*

U.S. Cl. 524—571 53 Claims

1. A composition which is a formable and vulcanisable rubber mixture comprising a rubber (A) which still contains double bonds and which can be cross-linked with sulphur and a vulcanisation accelerator to form an elastomer or a mixture of such a rubber (A) with a different rubber (B) and from 0.2 to 10 parts by weight of sulphur, from 0.2 to 10 parts by weight of at least one vulcanisation accelerator and from 1 to 10 parts by weight of a silane corresponding to the formula

$$[R_n^1(RO)_{3-n}Si\text{-}Alk\text{-}]_2S_x \quad (I)$$

in which

R and $R^1$ represent an alkyl group containing from 1 to 4 carbon atoms, a cycloalkyl group containing from 5 to 8 carbon atoms or the phenyl radical; all the radicals R and $R^1$ may be the same or different in meaning,

n=0, 1 or 2,

Alk is a difunctional hydrocarbon radical containing 1 to 10 carbon atoms, and

x is a number of from 2.0 to 8.0,

or its hydrolysate, all parts by weight being based on 100 parts by weight of rubber, wherein the rubber mixture contains the silane, vulcanisation accelerator and sulphur, expressed as $S_8$, in such a molar ratio that, at the vulcanisation temperature, the rubber mixture has a reversion R resulting from the cross-linking isotherm (DIN 53 529) of 0 (±5%), the reversion R being calculated in accordance with the following formula:

$$R = \frac{D_{max} - D_{(max+60\ mins)}}{D_{max} - D_{min}} \cdot 100 \quad (II)$$

in which

$D_{max}$ is the maximum vulcameter torque,

$D_{min}$ is the minimum vulcameter torque,

$D_{(max+60\ mins)}$ is the vulcameter torque as measured 60 minutes after appearance of the maximum torque.

3. A rubber mixture according to claim 1 containing (1) 1 to 300 parts by weight of silicate filler, (2) from 0.1 to 150 parts by weight of carbon black filler or (3) a mixture of a silicate filler and a carbon black filler, the total amount of filler being 1 to 300 parts by weight of which 0.1 to 150 parts by weight is carbon black, all parts by weight being based on 100 parts by weight of rubber.

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## 4,517,337
## ROOM TEMPERATURE VULCANIZABLE ORGANOPOLYSILOXANE COMPOSITIONS AND METHOD FOR MAKING

Thomas P. Lockhart, Bethesda, Md., and Jeffrey H. Wengrovius, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 24, 1984, Ser. No. 583,530

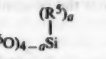
Int. Cl.[3] C08L *83/02*

U.S. Cl. 524—859 21 Claims

1. Room temperature vulcanizable compositions comprising by weight,

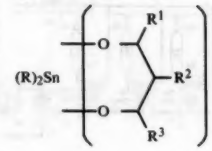
(A) 100 parts of organopolysiloxane consisting essentially of chemically combined diorganosiloxy and terminated with polyalkoxy siloxy units,

(B) 0 to 10 parts of a polyalkoxy silane of the formula

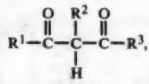


(C) 0 to 5 parts of amine accelerator,

(D) an effective amount of a tin condensation catalyst of the formula



(E) 0 to 5 parts of a β-diketone of the formula



(F) 0 to 700 parts of filler,

where R is selected from $C_{(1\text{-}18)}$ monovalent hydrocarbon radicals and substituted monovalent hydrocarbon radicals, and $R^1$, $R^2$ and $R^3$ are the same or different monovalent radials selected from the class consisting of hydrogen, R, $-Si(R)_3$, acyl and nitrile $R^5$ is a monovalent radical selected from $C_{(1\text{-}13)}$ hydrocarbon radicals and substituted $C_{(1\text{-}13)}$ hydrocarbon radicals, $R^6$ is a $C_{(1\text{-}8)}$ aliphatic organic radical selected from alkyl radicals, alkylether radicals, alkyl ester radicals, alkylketone radicals and alkylcyano or a $C_{(7\text{-}13)}$ aralkyl radical and a is a whole number equal to 0 or 1.

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## 4,517,338
## MULTIPLE REACTOR SYSTEM AND METHOD FOR POLYNUCLEOTIDE SYNTHESIS

Mickey S. Urdea, San Francisco, Calif., and Brian D. Warner, Eau Claire, Wis., assignors to Chiron Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 506,153, Jun. 20, 1983, Pat. No. 4,483,964. This application Jul. 13, 1984, Ser. No. 630,781

Int. Cl.[3] C12M *1/00*

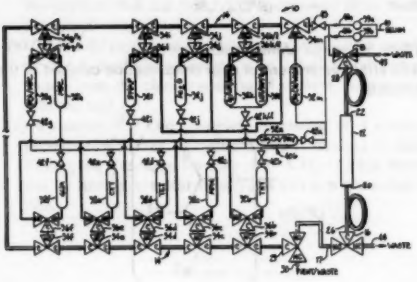
U.S. Cl. 525—54.11 19 Claims

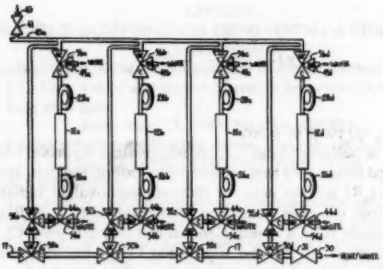
1. A reactor system for the sequential modification of two more linear polymers attached to dispersed solid-phase support, said reactor system comprising:

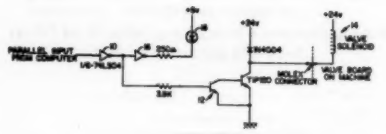
a plurality of reactor zones for holding said dispersed solid-phase supports, said reactor zones having at least two access ports defined by porous barriers;

a reagent manifold for selectively delivering particular reagents to each reactor zone one at a time through said porous barriers;

means for selectively blocking the flow of reagents to the reactor zones from the reagent manifold; and







means for selectively inducing a continuously reversing flow of reagent through each reactor zone when the flow of reagents to that reactor is blocked.

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**4,517,339**

**BLEND OF IMPACT MODIFIER, VINYL CHLORIDE POLYMER, AND GLASSY AMORPHOUS POLYMER**

**Anthony C. Aliberto, Briarcliff Manor, and Joseph Silberberg, Brooklyn, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 382,538, May 27, 1982, abandoned. This application Aug. 4, 1983, Ser. No. 520,104**

**Int. Cl.³ C08L *51/00, 33/08, 33/10, 27/06***

**U.S. Cl. 525—85** **20 Claims**

1. A flame retardant blend having good impact resistance and a high heat deflection temperature comprising:

(1) a three stage interpolymer comprising: (a) crosslinked (meth)acrylate; (b) crosslinked styrene-acrylonitrile; and (c), as the third stage, uncrosslinked styrene-acrylonitrile components;

(2) a glassy amorphous polymer which is an acrylic resin or a polymer comprising styrene; and

(3) a vinyl chloride polymer.

**4,517,340**

**ADHESIVE COMPOSITION**

**Michael R. Read, Whelford, Nr. Fairford, England, and Nicholas T. Corke, Keerbergen, Belgium, assignors to Raychem Corporation, Menlo Park, Calif.**

**Continuation of Ser. No. 411,246, Aug. 25, 1982, abandoned. This application Jul. 12, 1984, Ser. No. 630,335**

**Int. Cl.³ C08F *8/00; C08L 63/00***

**U.S. Cl. 525—113** **9 Claims**

1. A dimensionally-recoverable article having on at least part of a surface thereof an adhesive composition which comprises:

(a) a thermoplastic polyamide having reactive amine groups;

(b) a thermoplastic copolymer of an alkene with an ethylenically unsaturated ester of an alkanol and a carboxylic acid, the ester having up to 6 carbon atoms, and optionally one or more acidic comonomers, said copolymer having an acid number of at least 1;

(c) an epoxy resin;

components (a) and (b) being present in a ratio of from 35:65 to 75:25 by weight and component (c) being present in an amount of from 8 to 79 parts per hundred parts of components (a) and (b) by weight, components (a), (b) and (c) existing separately from one another in the form of particles that are mixed together.

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**4,517,341**

**PROCESS FOR PREPARING POLYPHENYLENE OXIDE-RUBBER GRAFT COPOLYMERS AND PRODUCTS OBTAINED THEREBY**

**Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 402,398, Jul. 27, 1982, abandoned. This application Oct. 24, 1983, Ser. No. 544,341**

**Int. Cl.³ C08F *8/00***

**U.S. Cl. 525—152** **16 Claims**

1. A process for producing a polyphenylene oxide-rubber graft copolymer which comprises the steps of:

(A) forming a polyphenylene oxide by oxidative coupling of at least one phenol in the presence of a catalyst which includes at least one compound selected from the group consisting of primary and secondary amines, said compound producing grafting sites on said polyphenylene oxide;

(B) intimately contacting said polyphenylene oxide having grafting sites with at least one unsaturated rubber which is free from any substantial amount of crosslinking; and subsequently

(C) heating the resulting blend at a temperature of about 250°–350° C. and a pressure of about 1,000–20,000 psig for a time sufficient to form said graft copolymer;

said polyphenylene oxide being maintained at a temperature substantially below its glass transition temperature at all times prior to grafting.

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**4,517,342**

**HEAT CURABLE COMPOSITIONS**

**Hong-Son Ryang, Camarillo, Calif., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 507,182, Jun. 23, 1983, abandoned. This application May 11, 1984, Ser. No. 609,365**

**Int. Cl.³ C08G *69/48***

**U.S. Cl. 525—431** **13 Claims**

1. A heat curable composition comprising

(A) a norbornane silicone block copolymer having chemically combined blocks selected from

(i) polyorganosiloxane having chemically combined $\equiv SiH$ or $\equiv SiC_2H_3$ units, and

(ii) and mixture of (i) and polyimide,

(B) a polyfunctional organosilicon material capable of undergoing a polyaddition reaction with (A) involving addition between chemically combined $\equiv SiH$ or $\equiv SiC_2H_3$

units, which polyfunctional organosilicon material has at least two chemically combined $\equiv SiH$ or $\equiv SiC_2H_3$ units and is selected from organosilanes, organopolysilanes, organosiloxanes, organopolysiloxanes and cyclopolyorganosiloxanes, and

(C) an effective amount of a platinum catalyst.

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**4,517,343**

## CATHODICALLY ELECTRODEPOSITABLE SURFACE COATING BINDER

**Eberhard Schupp, Schwetzingen, and Fritz E. Kempter, Mannheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Nov. 15, 1982, Ser. No. 441,806**

**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1981, 3146640**

**Int. Cl.³ C08L** *61/12, 63/02*

**U.S. Cl. 525—488** **9 Claims**

1. A cathodic electrocoating binder which is based on polyadducts, copolymers of polycondensates possessing basic nitrogen groups in each case, and can be diluted with water when protonated with an acid, wherein the binder comprises a mixture of

(A) from 50 to 95 percent by weight of one or more polyadducts, copolymers or polycondensates which possess basic nitrogen groups in each case and

(B) from 50 to 5 percent by weight of one or more amideamines obtained by reacting a monocarboxylic acid of 6 to 24 carbon atoms or a dicarboxylic acid of 4 to 48 carbon atoms, or their esters, with a diamine which possesses one primary and one secondary amino group per molecule, the secondary amino group carrying a $\beta$-hydroxyalkyl group, with the proviso that component (A) consists of ($A_1$) one or more phenolic Mannich bases, which are obtained from

(a) monophenols or polyphenols,

(b) one or more secondary amines, each of which possesses one or more hydroxyalkyl groups, or a mixture of a secondary amine of this type with another secondary or primary amine and

(c) formaldehyde or a formaldehyde donor, or

($A_2$) one or more polyadducts, copolymers, or polycondensates possessing acrylic, methacrylic or crotonic double bonds which are incorporated via an amide or ester group, some or all of which can be blocked by adduct formation with a secondary amine, or a mixture of ($A_1$) and ($A_2$), and, instead of a mixture of (A) and (B), the reaction product of component (B) with component (A) or with an intermediate of component (A) can also be used.

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**4,517,344**

## PROCESS FOR POLYMERIZATION OF ACRYLATE OR METHACRYLATE

**Toragoro Mitani, Takasago; Hideo Yasui, Kobe, and Hisashi Morikawa, Kakogawa, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

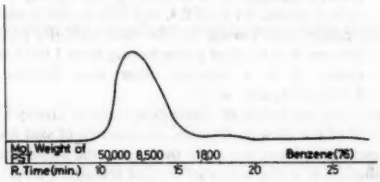
**Continuation-in-part of Ser. No. 540,155, Oct. 7, 1983, abandoned. This application Jul. 25, 1984, Ser. No. 634,067**

**Claims priority, application Japan, Oct. 12, 1982, 57-179575; Jun. 20, 1984, 59-126990**

**Int. Cl.³ C08F** *2/00*

**U.S. Cl. 526—62** **12 Claims**

1. In a process for emulsion-polymerizing an acrylate or a methacrylate monomer alone, a mixture thereof or a mixture of an acrylate or a methacrylate monomer as a main component and other copolymerizable monomers in the presence of water, an emulsifier and a polymerization initiator soluble in water or the monomers, wherein the amount of said acrylate monomer, methacrylate monomer or mixture thereof becomes not less than 60% by weight of the monomer mixture in the course of the emulsion polymerization; the improvement which comprises carrying out the emulsion polymerization in a polymerization vessel having a film on an inner surface thereof and on surfaces of attached instruments within the vessel, said film being formed by applying a solution of an aromatic quinoneamine compound having an average molecular weight of not less than 3,000 dissolved in an organic solvent, said quinoneamine compound being prepared by subjecting an aromatic




diamine and an aromatic quinone to addition reaction in an organic solvent medium having a solubility parameter of 9.0 to 12.2 alone, a mixture thereof or a mixed medium of said organic solvent medium with an alcohol in an amount of the same or less than the weight of the organic solvent medium.

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**4,517,345**

## POLYMERIZATION PROCESS

**Paul L. Eve, and John G. Speakman, both of West Lothian, Scotland, assignors to BP Chemicals Limited, London, England**

**Continuation of Ser. No. 133,825, Mar. 25, 1980, abandoned. This application Aug. 23, 1982, Ser. No. 410,576**

**Claims priority, application United Kingdom, Mar. 28, 1979, 7911257**

**Int. Cl.³ C08F** *4/24, 10/02*

**U.S. Cl. 526—105** **10 Claims**

1. A process for polymerizing ethylene or a mixture of ethylene with up to 40 wt % (based on a total monomer) of other 1-olefinic monomer comprising (a) supporting chromium oxide, or a compound calcinable thereto, at the heating temperature stated in part (c) hereof, on the refractory oxide support material comprising silica, (b) adding a tetravalent titanium compound having the formula $Ti(OR)_mX_n$, wherein m+n is 4, m is zero or an integer from 1 to 4, R is an organic hydrocarbon group having 1 to 12 carbon atoms, X is halogen or a hydrocarbon group and when the compound contains more than one R or X group, the groups may be the same or different, (c) heating the product at a temperature of from about 400° to 900° C. such that an active polymerization catalyst is formed, and (d) contacting the monomer with the active polymerization catalyst in the presence of an aluminum trialkyl, said tetravalent titanium compound being added in an amount sufficient to give a titanium concentration in the range of 0.05 to 20% by weight and said aluminum trialkyl being employed in the amount of 0.1 to 100% by weight based on the total weight of the catalyst.

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**4,517,346**

## ACTIVATOR COMPRISING A DIALKYLALUMINUM MONOFLUORIDE FOR THE POLYMERIZATION OF ETHYLENE

**Karel Bujadoux, Lens, France, assignor to Societe Chimique des Charbonnages S.A., France**

**Division of Ser. No. 324,957, Nov. 25, 1981, Pat. No. 4,396,532. This application May 9, 1983, Ser. No. 492,655**

**Claims priority, application France, Dec. 23, 1980, 80 27270**

**Int. Cl.³ C08F** *4/64, 10/02*

**U.S. Cl. 526—153** **3 Claims**

1. A process for polymerizing ethylene and copolymerizing ethylene with an alpha-olefin having from 3 to 8 carbon atoms, comprising reacting ethylene under a pressure between 200 and 2,500 bars and at a temperature between 160° and 300° C. in a polymerization reactor in the presence of a catalytic sys-

tem, the mean residence time of the catalytic system in the polymerization reaction being from 2 to 100 seconds, wherein said catalytic system comprises:

(a) at least one organoaluminum activator compound selected from the group consisting of

(i) compounds having the formula $(AlR_2F)$ $(AlR_2H)_b$ $(AlR_3)_c$ wherein R is an alkyl group having 1 to 12 carbon atoms, $0.1 \leqq b \leqq 0.4$, and $0.05 \leqq c \leqq 0.2$; and

(ii) compounds having the formula $(AlR_2F)$ $(AlR_2X)_a$ wherein R is an alkyl group having from 1 to 12 atoms, X is a halogen other than fluorine, and $0.1 \leqq a \leqq 0.4$; and

(b) at least one halide of a transition metal of Group IVB to VIB of the Periodic System, the valency of said metal in said halide being not more than 3 and the atomic ratio of aluminum in the activator to said transition metal lying between 0.1 and 10.

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**4,517,347**

## METHOD FOR COPOLYMERIZATION OF STYRENE AND ACRYLONITRILE

**John W. Gowan, Jr., and Carlton G. Force, both of Mt. Pleasant, S.C., assignors to Westvaco Corporation, New York, N.Y.**

**Filed Jul. 25, 1984, Ser. No. 634,223**

**Int. Cl.³ C08F *212/10***

**U.S. Cl. 526—216** **12 Claims**

1. In a method of emulsion polymerization of styrene and acrylonitrile wherein styrene and acrylonitrile are copolymerized in an aqueous medium in the presence of an emulsifier, the improvement comprising adding to said medium an anti-oxidant selected from the group consisting of an anti-oxidant compound comprising an aromatic portion and a fatty acid portion, octadecyl hydroquinone, and 4-dodecyloxy-2-hydrobenzophenone in an amount sufficient to increase the yield of styrene-acrylonitrile copolymer.

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**4,517,348**

## RUBBERY POLYMER COMPOSITION

**Kohki Takahashi; Takeo Kondoh, both of Sagamihara; Masao Koga, Machida, and Kenichiro Nishiwaki, Ichihara, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

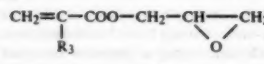
**Continuation of Ser. No. 274,537, Jun. 17, 1981, abandoned, which is a division of Ser. No. 94,951, Nov. 16, 1979, Pat. No. 4,303,560. This application Jul. 18, 1983, Ser. No. 514,366**

**Claims priority, application Japan, Mar. 17, 1979, 54-31590; Mar. 17, 1979, 54-31591**

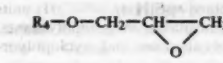
**Int. Cl.³ C08F *218/08, 218/10***

**U.S. Cl. 526—273** **6 Claims**

1. A rubber polymer composition, consisting essentially of: a crosslinkable polymer having a Mooney viscosity $(ML_{1+4})$ of 35 to 50 at 100° C. prepared by copolymerizing (A) from 15 to 40 parts by weight of a vinyl carboxylate of the formula: $RCOO—CH=CH_2$, wherein R is a $C_{1-4}$ alkyl group, (B) from 60 to 85 parts by weight of an alkoxyalkyl acrylate of the formula: $CH_2=CHCOO—R_1—O—R_2$, wherein $R_1$ is a $C_{1-4}$ alkylene group and $R_2$ is a $C_{1-4}$ alkyl or alkoxyalkyl group, (C) from 4 to 15 parts by weight of ethylene, with the total of components A, B and C constituting 100 parts by weight, and (D) from 0.3 to 5 parts by weight of a comonomer selected from the group consisting of



wherein $R_3$ is hydrogen or methyl,



wherein $R_4$ is a vinyl, allyl or methallyl group, and $CH_2=CH—O—R_5$, wherein $R_5$ is $CH_2Cl—CH_2—$ or $CH_2Cl—CO—$.

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**4,517,349**

## PROCESS FOR THE PRODUCTION OF P-VINYL PHENOL POLYMER

**Hiroshi Fujiwara; Hatsutaro Yamazaki, both of Saitama, and Kazuo Ozawa, Ibaraki, all of Japan, assignors to Maruzen Oil Company, Limited, Osaka, Japan**

**Filed Nov. 2, 1983, Ser. No. 548,255**

**Claims priority, application Japan, Nov. 4, 1982, 57-194449**

**Int. Cl.³ C08F *4/70, 12/24***

**U.S. Cl. 526—313** **12 Claims**

1. A process for the production of p-vinyl phenol homopolymer which comprises polymerizing p-vinyl phenol in the presence of (a) phenols that do not have any unsaturated side chains and (b) a polymerization accelerator; wherein said polymerization is additionally carried out in the presence of water and iron wherein the amount of water present is 10 to 800% by weight based on the amount of the p-vinyl phenol and the amount of dissolved iron present is 3 to 500 PPM based on the amount of the p-vinyl phenol and wherein the amount of the phenols that do not have any unsaturated side chains is 10 to 100% by weight based on the amount of the p-vinyl phenol.

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**4,517,350**

## PROCESS FOR REMOVING POLYMER SCALE ADHERING TO A POLYMERIZATION VESSEL

**Akio Hata, and Michifumi Tanga, both of Yamaguchi, Japan, assignors to Tokuyama Sekisui Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation-in-part of Ser. No. 527,423, Aug. 29, 1983, abandoned. This application Apr. 27, 1984, Ser. No. 604,751**

**Claims priority, application Japan, Aug. 27, 1982, 57-149485**

**Int. Cl.³ C08F *114/06***

**U.S. Cl. 526—344.2** **2 Claims**

1. A method for removing polymer scale adhering to the inner surface of a polymerization vessel, which method comprises polymerizing vinyl chloride monomer in an aqueous medium, discharging the resulting polymer of vinyl chloride together with the aqueous medium from the polymerization vessel, thereafter placing in the vessel both a reaction product and an organic liquid, and washing the inner surface of the vessel with the organic liquid solution of the said reaction product, wherein the said reaction product is obtained by heating and reacting an amine compound with an acrylic compound at a temperature higher than 50° C., the said amine compound being selected from the group consisting of an aliphatic amine compound, alicyclic amine compound and aromatic amine compound having therein one or more amino-group(s) or iminogroup(s), the said acrylic compound being selected from the group consisting of acrylic acid, methacrylic acid, acrylic acid ester, methacrylic acid ester and acryl amide, and said organic liquid can dissolve or swell the polymer of vinyl chloride.

**4,517,351**

## PROCESS FOR REACTING QUATERNARY AMMONIUM MONOMER IN THE PRESENCE OF ANIONIC POLYMERS

**Chester D. Szymanski, Martinsville, and Dennis Neigel, Whitehouse Station, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Continuation-in-part of Ser. No. 407,014, Aug. 11, 1982, Pat. No. 4,455,408. This application Jun. 18, 1984, Ser. No. 621,403**

**Int. Cl.³ C08L 99/00**

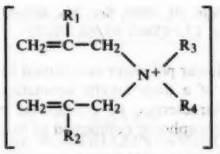
**U.S. Cl. 527—312** **12 Claims**

1. A process for reacting quarternary ammonium monomers in the presence of anionic polymers to directly form a dry coacervate consisting essentially of the steps of:

(a) forming a solution of the monomer(s), anionic polymer, solvent and free-radical initiator;

(b) simultaneously polymerizing the monomers and drying the solution at a temperature above the boiling point of the solvent to obtain a dry solid without further separating and drying or otherwise isolating the polymerizate; and

(c) recovering the resultant dry product; wherein the quaternary ammonium monomers are represented by the following formula:



where $R_1$ and $R_2$ each represent a member selected from the group consisting of hydrogen and methyl and ethyl radicals; $R_3$ and $R_4$ each represent a member selected from the group consisting of alkyl, aryl, cycloalkyl, hydroxyalkyl and alkoxyalkyl radicals having from 1 to 18 carbon atoms, and Y− represents an anion; and wherein the anionic polymer is an anionic polysaccharide derivative and is present in an amount of 0.1 to 3 parts by weight per part of the monomeric components.

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**4,517,352**

## ONE PACKAGE, STABLE, MOISTURE CURABLE, POLYALKOXY-TERMINATED ORGANOPOLYSILOXANE COMPOSITIONS AND METHOD FOR MAKING

**Mary A. White; Melvin D. Beers, both of Schenectady; Gary M. Lucas, Scotia; Robert A. Smith, and Roger T. Swiger, both of Schenectady, all of N.Y., assignors to General Electric Company, Waterford, N.Y.**

**Division of Ser. No. 277,524, Jun. 26, 1981, Pat. No. 4,395,526. This application Apr. 20, 1983, Ser. No. 486,975**

**Int. Cl.³ C08G 77/06**

**U.S. Cl. 528—18** **13 Claims**

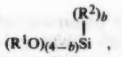
1. A method of making a one-package and substantially acid-free room temperature vulcanizable composition curable to the solid elastomeric state, which method comprises agitating under substantially anhydrous conditions at a temperature in the range of from 0° C. to 180° C., a room temperature vulcanizable material selected from

(i) a mixture comprising

(a) 100 parts of a silanol-terminated polydiorganosiloxane consisting essentially of chemically combined units of the formula

(b) a stabilizing amount of a silane scavenger for hydroxy functional groups of the formula

(c) 0.01 to 10 parts of cross-linking silane of the formula

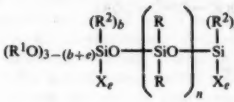


(d) an effective amount of a condensation catalyst, and

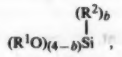
(e) 0 to 5 parts of a curing accelerator selected from the group consisting of substituted guanidines, amines and mixtures thereof; and

(ii) a mixture comprising

(a) 100 parts of a polyalkoxy-terminated polydiorganosiloxane of the formula

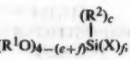


(iii) 0 to 10 parts of a cross-linking silane of the formula,



(iv) an effective amount of a condensation catalyst

(v) a stabilizing amount of a silane scavenger for hydroxy functional groups having the formula



and

(vi) 0 to 5 parts of a curing accelerator selected from the group consisting of substituted guanidines, amines and mixtures thereof,

where R is selected from $C_{(1-13)}$ monovalent substituted or unsubstituted hydrocarbon radicals, $R^1$ is a $C_{(1-8)}$ aliphatic organic radical selected from the group consisting of alkyl, alkylether, alkylester, alkylketone and alkylcyano radicals, or a $C_{(7-13)}$ alkaryl radical, $R^2$ is a $C_{(1-13)}$ monovalent substituted or unsubstituted hydrocarbon radical, X is a hydrolyzable leaving group selected from the group consisting of amido, amino, carbamato, enoxy, imidato, isocyanato, oximato, thioisocyanato and ureido radicals and, a is an integer equal to 1 or 2, b is a whole number equal to 0 or 1, and the sum of a+b is equal to 1 or 2, c is a whole number equal to 0 to 3 inclusive, d is an integer equal to 1 to 4 inclusive, and the sum of c+d is equal to 3 or 4, e is a whole number equal to 0 or 1 and the sum of b+e is equal to 0 to 1, n is an integer having a value of from about 50 to about 2500 inclusive, c is a whole number equal to 0 to 3 inclusive, f is an integer equal to 1 to 4 inclusive and the sum of c+f is equal to 1 to 4 inclusive, and in either mixture where X is enoxy, there is also added, before or with the scavenger, 0.1 to 5 parts of a curing accelerator selected from the group consisting of substituted guanidines, amines and mixtures thereof.

**4,517,353**

## PROCESS FOR PREPARATION OF HYDANTOIN ESTERS THROUGH A MASKED POLYISOCYANATE-CARBODIIMIDE ROUTE

**Wilfried Zecher; Rudolf Merten, and Willi Dünwald, all of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

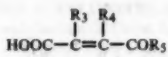
**Filed Dec. 6, 1983, Ser. No. 558,902**

**Claims priority, application Fed. Rep. of Germany, Dec. 22, 1982, 3247350**

**Int. Cl.³ C08G** *18/80*

**U.S. Cl. 528—45** **9 Claims**

1. A process for the preparation of polymers containing hydantoin groups wherein polyisocyanates masked with from 0.5 to 0.005 mol of lactam per isocyanate group in the polyisocyanate are converted into (poly)carbodiimides, and these carbodiimides are reacted with $\alpha,\beta$-unsaturated carboxylic acids to form (poly)hydantoins, and these (poly)hydantoins are reacted with additional carboxylic acids or anhydrides or esters thereof which contain at least one free carboxylic acid group capable of reacting with acylureas, and said $\alpha,\beta$-unsaturated carboxylic acids are of the formula



wherein

$R^5$ represents -$OR^6$ or

$R^6$, $R^7$ and $R^8$ represent, independently of each other, alkyl, cycloalkyl, alkenyl, alkinyl, aryl or aralkyl groups and additionally,

$R^7$ and $R^8$ may also represent hydrogen, and

$R^3$ and $R^4$ represent, independently of each other, either hydrogen or alkyl.

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**4,517,354**

## POLYSULFONE COMPOSITIONS AND DERIVATIVES THEREOF

**Gaetano F. D'Alelio, deceased, late of South Bend, Ind. (by St. Joseph Bank and Trust Company, executor), assignor to Plastics Engineering Company, Sheboygan, Wis.**

**Continuation-in-part of Ser. No. 280,950, Jul. 6, 1981, abandoned. This application Oct. 31, 1983, Ser. No. 547,021**

**Int. Cl.³ C08G** *69/32, 69/40, 69/42*

**U.S. Cl. 528—172** **30 Claims**

1. A polysulfone composition having the formula M—Ar-$SO_2$Ar'QAr'$SO_2$Ar—M wherein:

Ar and Ar' represent divalent aromatic groups and 2-5 of said divalent aromatic groups linked by O, S, C(O), N(R''), $SO_2$ or an aliphatic hydrocarbon group;

Q is either O or $SO_2$, and

M is a group selected from the class consisting of:

(a) DOOCArO—

(b) $R_2$NOCArO—

(c) KO—

(d) HOArO—

(e) R''C(O)ArO—

(f) $(DOOC)_2$ArO—

(g) O(OC)$_2$ArO—

(h)—NR—R'—NR(O)CArO—A—OArC(O)—

(i) —OR'O(O)CArO—A—OArC(O)—

(j) —CHRAr''(OH)O—A—OAr''(OH)—

(k) —(O)CArC(O)OArO—A—OArO—

(l) —(O)COArO—A—OArO—

(m) —(O)CArO—A—OArC(O)OArO—A—OArO—

(n) —N(R)ArO—A—OArN(R)(O)CAr—A—ArC(O)—

wherein

Ar is as defined above;

D represents hydrogen, halogen or a monovalent hydrocarbon group of one to 20 carbon atoms;

R is a hydrogen or a hydrocarbon group or 2-5 of hydrocarbon groups joined by —O—, —S—, —COO—, —OOC— or —$SO_2$—;

R' is a divalent hydrocarbon group;

R'' is a hydrocarbon group of 1-20 carbon atoms;

K is an aromatic group having a terminal vinyl or acetylene radical;

Ar'' is a trivalent aromatic group; and

A represents the divalent radical —Ar$SO_2$Ar'QAr'-$SO_2$Ar—.

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**4,517,355**

## FLAMEPROOF LINEAR POLYESTER, A PROCESS FOR ITS PREPARATION, AND ARTICLES FORMED FROM SAID POLYESTER

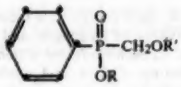
**Giorgio Mercati, Monza; Armando Mariano, Pisticci Scalo; Fulvio Pertot, Crema; Antonio Glionna, and Mario Ferri, both of Matera, all of Italy, assignors to Anic S.p.A., Palermo, Italy**

**Filed Apr. 20, 1983, Ser. No. 486,902**

**Int. Cl.³ C08G** *63/68, 79/02*

**U.S. Cl. 528—287** **11 Claims**

1. A flameproof linear polyester constituted by the polycondensation product of a dicarboxylic aromatic acid with an alkylene glycol, characterised by containing, bonded in the macromolecule, a phosphorus compound of formula:



where R is a hydrogen atom, an alkyl group of 1 to 4 carbon atoms or a hydroxyalkyl group, and R' is a hydrogen atom, a hydroxyalkyl group or the group $-(CH_2CH_2O)_nH$, where n varies from 1 to 4, the quantity of said bonded monomer being such as to obtain a quantity of phosphorus (expressed as the metal) in the linear polyester of between 0.4 and 0.8% by weight.

4. A process for preparing the linear polyester as claimed in claims 1 to 3, characterised in that:

the dicarboxylic aromatic acid and the alkylene glycol are reacted together in a molar ratio of the order of 1:1.5 at a temperature in the range of 180°-240° C. and in the presence of a catalyst, until a precondensate is obtained having a molecular weight of between about 400 and about 1000;

the phosphorus compound is added to said precondensate;

the mixture is polycondensed at a temperature in the range of 265°-280° C. under a pressure decreasing from 760 torr to less than 1 torr in the presence of a catalyst, until the content of free carboxyl groups is reduced to a value of the order of 10-20 meq/kg.

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**4,517,356**

## PROCESS FOR POLYMERIZING THERMOSETTING RESINS

**Francois Lambert, 85 Rue de la Convention, 75015 Paris, and Christian Val, 81 Rue de Paris, 78470 St Remy lès Chevreuse, both of France**

**Filed Oct. 7, 1983, Ser. No. 539,914**

**Claims priority, application France, Oct. 8, 1982, 82 17180**

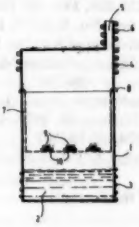
**Int. Cl.³ C08F** *6/00;* **B29C** *25/00*

**U.S. Cl. 528—483** **3 Claims**

1. A process for the polymerization of a thermosetting resin which comprises the steps of:

placing a cold shaped body of thermosetting resin to be

polymerized, in the vapor phase of an organic boiling liquid, to obtain polymerization of said resin at a temperature of more than 100° C. wherein the temperature and pressure are held constant at the boiling point of said



liquid and heat is transferred to said body of condensation of said liquid at said temperature directly on said body; and

recovering the shaped body of polymerized thermosetting resin.

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**4,517,357**

## SYMMETRICAL BIS-(TRIAZINYAMINO PHENYL AZO ACETOACETANILIDE) DYESTUFFS

**Klaus Kunde, Leverkusen, and Frank-Michael Stöhr, Burscheid, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

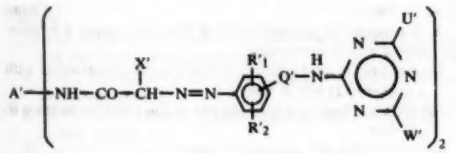
**Filed Aug. 30, 1982, Ser. No. 413,004**

**Claims priority, application Fed. Rep. of Germany, Sep. 16, 1981, 3136679**

**Int. Cl.³ C09B** *31/11, 33/153, 44/08, 44/10*

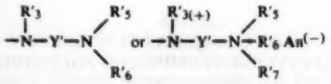
**U.S. Cl. 534—605** **2 Claims**

1. A dyestuff of the formula

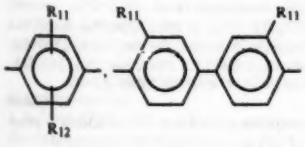


wherein

U' and W' independently of each other are radicals of the formulae



A' is a radical of the formula



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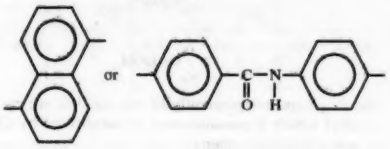

wherein

$R_{11}$ and $R_{12}$, in turn and independently of each other, designate H, Cl, Br, $OCH_3$, $OC_2H_5$, $CH_3$ or $C_2H_5$,

Q' is a direct bond or a radical p-$NHCOC_6H_4$— or p-$CONHC_6H_4$—,

X' is a radical of the formula —$COCH_3$, —CN, —$COOCH_3$, —$COOC_2H_5$, —$CONH_2$—$COC_6H_5$ or —CON(R'-3)—Y'N($R'_5R'_6R'_7$)$^{(+)}$ $An^{(-)}$,

Y' is a direct bond, $C_2$–$C_5$-alkylene, $C_5$–$C_7$-oxaalkylene, phenylene or benzylene,

$R'_1$ and $R'_2$ independently of each other are H, Cl, Cl, Br, —$OCH_3$—, —$OC_2H_5$, —$CH_3$ or $C_2H_5$,

$R'_3$ is hydrogen, $C_1$–$C_4$-alkyl, β- or γ-$C_2$–$C_4$-hydroxyalkyl,

$R'_5$–$R'_7$ independently of each other are hydrogen, $C_1$–$C_4$-alkyl or $C_2$–$C_4$-alkyl which is substituted by hydroxyl, amino, $C_1$–$C_4$-alkylamino, di-$C_1$–$C_4$-alkylamino or tri-$C_1$–$C_4$-alkylammonium, phenyl, or benzyl or

$R'_5$ and $R'_6$ in each case together with the nitrogen, form a pyrrolidine, morpholine, piperazine or piperidine radical, or a $C_1$–$C_4$ alkyl substituted pyrrolidine, morpholine, piperazine or piperidine radical or Y', $R'_3$ and $R'_5$, together with the particular nitrogen, form a peperazine radical or a $C_1$–$C_4$-alkyl substituted piperazine radical,

$R'_5$, $R'_6$ and $R'_7$ together with the nitrogen, are a pyridinium radical or a $C_1$–$C_4$ alkyl substituted pyridinium radical, and

$An^{(-)}$ is an anion.

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**4,517,358**

## DISAZO BIS-BENZTHIAZOLYL COMPOUNDS

**Visvanathan Ramanathan, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

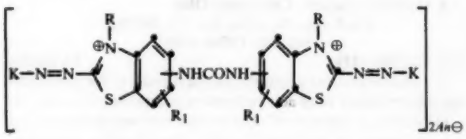
**Filed Sep. 14, 1982, Ser. No. 418,177**

**Claims priority, application Switzerland, Sep. 22, 1981, 6106/81**

**Int. Cl.³ C09B** *35/03, 35/26, 44/08, 44/20*

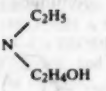
**U.S. Cl. 534—608** **8 Claims**

1. A disazo compound of the formula



wherein

the K groups independently of one another are each a coupling component selected from radicals of compounds of the group consisting of an acetoacetic acid anilide, a phenol, an aminopyrimidine, a pyridone, quinolone, pyrazolone, aminopyrazole, indole, aniline, aminopyridine, naphthol, naphthol carboxylic acid anilide, naphthylamine, aminothiazole, thiophene, tetrahydroquinoline and benzomorpholine, said groups being unsubstituted or substituted by (1) $C_1$–$C_4$-alkyl or $C_1$–$C_4$ alkyl substituted by $NH_2$, OH, or Cl, (2) $C_1$–$C_4$-alkoxy or $C_1$–$C_4$ alkoxy substituted by OH or Cl, (3) halogen from the group of F, Cl and Br, (4) $NO_2$, (5) OH, (6) CN or (7)



the R groups independently of one another are each $C_1$–$C_4$ alkyl which is unsubstituted or substituted by OH, halogen, $CONH_2$ or phenyl

the $R_1$ groups independently of one another are each (1) hydrogen, (2) $C_1$–$C_4$-alkyl which is unsubstituted or substituted by halogen, OH or CN, (3) $C_1$–$C_4$-alkoxy which is unsubstituted or substituted by $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, halogen or CN, or (4) halogen, and

An is an anion.

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**4,517,359**

**11-METHYL-11-AZA-4-0-CLADINOSYL-6-0-DESOSAMINYL-15-ETHYL-7,13,14-TRIHYDROXY-3,5,7,9,12,14-HEXAMETHYL-OXACYCLOPENTADECANE-2-ONE AND DERIVATIVES THEREOF**

**Gabrijela Kobrehel, and Slobodan Djokic, both of Zagreb, Yugoslavia, assignors to Sour Pliva farmaceutska, kemijska prehrambena i kozmeticka industrija, n.sol.o., Zagreb, Yugoslavia**

**Filed Sep. 22, 1981, Ser. No. 304,481**

**Claims priority, application Yugoslavia, Mar. 6, 1981, 592/81**

**Int. Cl.³ C07H** *17/08*

**U.S. Cl. 536—7.4** **1 Claim**

1. N-methyl-11-aza-10-deoxo-10-dihydro erythromycin A.

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**4,517,360**

**SYNTHESIS OF HIGHER POLYOL FATTY ACID POLYESTERS USING CARBONATE CATALYSTS**

**Robert A. Volpenhein, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 23, 1983, Ser. No. 507,825**

**Int. Cl.³ C07H** *1/00*

**U.S. Cl. 536—119** **17 Claims**

1. In a solvent-free transesterification process for synthesizing higher polyol fatty acid polyesters comprising the steps of:

(1) heating a mixture of (a) a polyol selected from a group consisting of monosaccharides, disaccharides and sugar alcohols, (b) a fatty acid ester selected from the group consisting of methyl esters, 2-methoxy ethyl esters, benzyl esters, and mixtures thereof, (c) an alkali metal fatty acid soap, and (d) a basic catalyst, to a temperature of from about 110° C. to about 180° C. at a pressure of from about 0.1 mm of mercury to about 760 mm of mercury to form a homogeneous melt; and

(2) subsequently adding to the reaction product of step (1) excess fatty acid ester selected from the group consisting of methyl esters, 2-methoxy ethyl esters, benzyl esters and mixtures thereof;

the improvement wherein the basic catalyst is potassium carbonate.

**4,517,361**

**CEPHALOSPORIN DERIVATIVES**

**Mitsuo Numata, Osaka; Isao Minamida, Kyoto; Masayoshi Yamaoka; Mitsuru Shiraishi, both of Osaka, and Toshio Miyawaki, Hyogo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

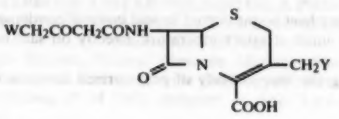
**Division of Ser. No. 235,609, Feb. 18, 1981, Pat. No. 4,421,912, which is a division of Ser. No. 863,719, Dec. 23, 1977, Pat. No. 4,379,924, which is a division of Ser. No. 534,782, Dec. 20, 1974, Pat. No. 4,080,498. This application Mar. 31, 1983, Ser. No. 480,791**

**Claims priority, application Japan, Dec. 25, 1973, 48-1521; Feb. 20, 1974, 49-20752; Apr. 15, 1974, 49-42574; Jul. 17, 1974, 49-82623; Nov. 13, 1974, 49-131381**

**Int. Cl.³ C07D** *501/28*

**U.S. Cl. 544—24** **20 Claims**

1. A compound of the formula,



wherein W is chlorine or bromine and Y represents acetoxy or a group of formula $-SR_3$ (where $R^3$ is a nitrogen-containing heterocyclic group), or a salt thereof.

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**4,517,362**

**PROCESS FOR PREPARING β′ FORM OF COPPER 8-HYDROXYQUINOLINE**

**Bernard Muller, St-Germain-en-Laye; René Piat, Bois-Guillaume; Cornelis Rensing, Oissel, and Jean-Paul Trajin, Rouen, all of France, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation of Ser. No. 393,219, Jun. 28, 1982, abandoned. This application Jan. 20, 1984, Ser. No. 572,606**

**Claims priority, application France, Jul. 6, 1981, 81 13249**

**Int. Cl.³ C07D** *215/30;* **A61K** *31/47*

**U.S. Cl. 546—7** **7 Claims**

1. A process for preparing the β′ form of copper 8-hydroxyquinoline which comprises:

(a) reacting an acid addition salt of 8-hydroxyquinoline with a copper (II) salt in water;

(b) adding a base to adjust the pH of the reaction mixture to pH 2–9;

(c) recovering the precipitate, and

(d) drying the precipitate at a temperature between about 40° to about 220° C.

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**4,517,363**

**VINYLACETYLENE-TERMINATED POLYIMIDE DERIVATIVES**

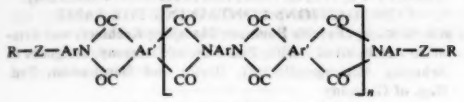
**Gaetano F. D'Alelio, deceased, late of South Bend, Ind. (St. Joseph Bank and Trust Company, legal representative), and Phillip A. Waitkus, Sheboygan, Wis., assignors to Plastics Engineering Company, Sheboygan, Wis.**

**Division of Ser. No. 353,871, Mar. 2, 1982, Pat. No. 4,435,323, and a continuation-in-part of Ser. No. 199,616, Oct. 22, 1980, abandoned. This application Dec. 12, 1983, Ser. No. 560,231**

**Int. Cl.³ C07D** *209/34, 471/00;* **C08F** *22/40*

**U.S. Cl. 546—66** **45 Claims**

1. The polyimide comprising the Diels-Alder addition product of (1) a conjugated enyne compound of the formula:



wherein:

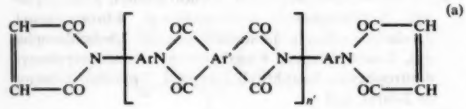
Ar′ is a tetravalent aromatic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to adjacent carbon atoms in Ar′ except in the case of Ar′ being a naphthalene radical, one or both pairs of the carbonyl groups may be attached to peri-carbon atoms;

Ar is a divalent aromatic radical;

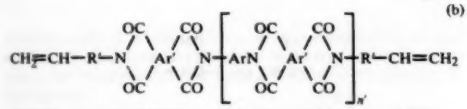
n is zero or an integer having a value of one to 20;

R is hydrogen or an organic moiety containing 1 to 21 carbon atoms;

Z is the structure —CH=CH—C≡C— or —C≡C—CH=CH—; and (2) a dienophile selected from the class consisting of

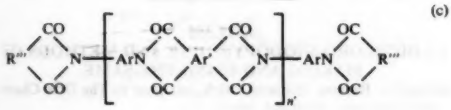


(a)



(b)

and



(c)

wherein

Ar and Ar′ in (a), (b) and (c) are the same as defined for Ar and Ar′ in the enyne compound,

n′ in (a), (b) and (c) is the same as defined for n in the said enyne compound,

R′ in (b) is a divalent organic moiety containing 1 to 12 carbon atoms, and

R‴ in (c) represents R*CH=CHAr<, and

R* in the R‴ of (c) is the same as defined above for R in the said enyne compound,

the addition being primarily between the enyne groups and the unsaturated groups of the dienophile.

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**4,517,364**

## VINYLACETYLENE-TERMINATED POLYIMIDE DERIVATIVES

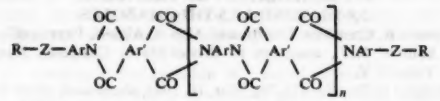
**Gaetano F. D'Alelio, deceased, late of South Bend, Ind. (by St. Joseph Bank and Trust Company, executor), and Phillip A. Waitkus, Sheboygan, Wis., assignors to Plastics Engineering Company, Sheboygan, Wis.**

**Division of Ser. No. 353,871, Mar. 2, 1982, Pat. No. 4,435,323, which is a continuation-in-part of Ser. No. 199,616, Oct. 22, 1980, abandoned. This application Dec. 27, 1983, Ser. No. 565,337**

**Int. Cl.³ C07D** *209/34, 471/00;* **C08F** *22/40*

**U.S. Cl. 546—66** **22 Claims**

1. The Diels-Alder addition product of (1) a conjugated diacetylene compound having the formula:



wherein:

Ar′ is a tetravalent aromatic organic radical, the four carbonyl groups being attached directly to separate carbon atoms and each pair of carbonyl groups being attached to the adjacent carbon atoms in Ar′ except in the case of Ar′ being a naphthalene radical, one or both pairs of the carbonyl groups may be attached to peri-carbon atoms;

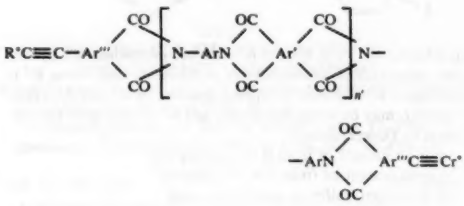
Ar is a divalent aromatic organic radical;

n is zero or an integer having a value of one to 20;

R is hydrogen or an organic moiety containing 1 to 21 carbon atoms;

Z is the structure —CH=CH—C≡C— or —C≡C—CH=CH—;

and (2) a dienophile containing at least one acceptor moiety having the formula R*C≡C— wherein R* is as defined above for R and the R*C≡C— is a non-conjugated acetylenic group, said dienophile being selected from the class consisting of diethynyl benzene, dipropargyl phthalate, 4,4′-diethynyl diphenyloxide, N-(ethynylphenyl) maleimide, dipropargyl maleate, $HC{\equiv}C{-}COOCH_2CH{=}CH_2$, $C_6H_5C{\equiv}C{-}COOCH_2CH{=}CH_2$, $C_6H_5C{\equiv}COOCH_2C{\equiv}CH$, $HC{\equiv}C{-}C_6H_4OOCC{\equiv}CCOOC_6H_4C{\equiv}CH$, $H_2C{=}CHC_6H_4OOCC{\equiv}C{-}COOC_6H_4CH{=}CH_2$ and



wherein:

n′ is zero or an integer having a value of one to 20; and Ar‴ is a trivalent aromatic radical containing 6 to 12 carbon atoms to which the attached pair of carbonyl groups is attached to adjacent or peri carbon atoms in said Ar‴ radical.

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**4,517,365**

## ISOCARBOSTYRIL DERIVATIVE

**Hiroyasu Koyama, Ageo; Masahiro Tsuji, Ohi, and Yoshikuni Suzuki, Ohmiya, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan**

**Filed Jun. 22, 1982, Ser. No. 390,977**

**Claims priority, application Japan, Jun. 25, 1981, 56-97430**

**Int. Cl.³ C07D** *217/28;* **A61K** *31/47*

**U.S. Cl. 546—142** **1 Claim**

1. 4-(3-tert.-butylamino-2-hydroxy)propoxyisocarbostyril hydrochloride.

## 4,517,366
## INTERMEDIATES FOR PREPARING 3,4-DIAMINO-1,2,5-THIADIAZOLES

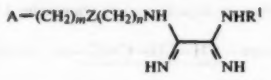
**Ronnie R. Crenshaw, Dewitt, and Aldo A. Algieri, Fayetteville, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

**Division of Ser. No. 473,791, Mar. 16, 1983, abandoned, which is a continuation-in-part of Ser. No. 363,207, Mar. 29, 1982, abandoned. This application Apr. 16, 1984, Ser. No. 600,864**

**Int. Cl.³ C07D** *295/14, 211/06, 401/12*

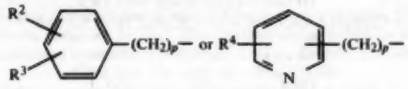
**U.S. Cl. 546—231** **6 Claims**

**1.** A compound of the formula



II

wherein $R^1$ is hydrogen, (lower)alkyl, 2-fluoroethyl, 2,2,2-trifluoroethyl, allyl, propargyl,

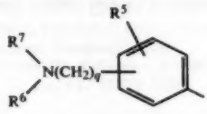


in which p is 1 or 2, $R^2$ and $R^3$ each are independently hydrogen, (lower)alkyl, (lower)alkoxy or halogen, and, when $R^2$ is hydrogen, $R^3$ also may be trifluoromethyl, or $R^2$ and $R^3$, taken together, may be methylenedioxy, and $R^4$ is hydrogen, (lower-)alkyl or (lower)alkoxy;

m is an integer of from 0 to 2 inclusive;

n is an integer of from 2 to 5 inclusive;

Z is oxygen, sulfur or methylene; and



in which $R^5$ is hydrogen, (lower)alkyl or (lower)alkoxy, q is an integer of from 1 to 4 inclusive and $R^6$ and $R^7$ each are independently (lower)alkyl, (lower)alkoxy(lower)alkyl in which the (lower)alkoxy moiety is at least two carbon atoms removed from the nitrogen atom, or phenyl(lower)alkyl, and, when $R^6$ is hydrogen, $R^7$ also may be cyclo(lower)alkyl, or $R^6$ and $R^7$, taken together with the nitrogen atom to which they are attached, may be pyrrolidino, methylpyrrolidino, dimethylpyrrolidino, morpholino, thiomorpholino, piperidino, methylpiperidino, dimethylpiperidino, N-methylpiperazino, 1,2,3,6-tetrahydropyridyl, homopiperidino, heptamethyleneimino, octamethyleneimino, 3-azabicyclo[3.2.2]non-3-yl or 3-pyrrolino; or a salt, hydrate or solvate thereof.

**4.** The compound of claim **1** which is N-{3-(3-piperidinomethylphenoxy)propyl}ethanediimidamide, or a salt, hydrate or solvate thereof.

## 4,517,367
## AZOLYL-PENTENE DERIVATIVES AND BIOCIDAL COMPOSITIONS CONTAINING THE SAME

**Carlo Skötsch; Dietrich Baumert; Hansjörg Krähmer, and Friedrich Arndt, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkaman, Fed. Rep. of Germany**

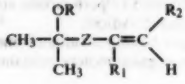
**Filed Dec. 6, 1982, Ser. No. 447,624**

**Claims priority, application Fed. Rep. of Germany, Dec. 4, 1981, 3148742**

**Int. Cl.³ A01N** *43/50, 43/64;* **C07D** *233/60, 249/08*

**U.S. Cl. 546—276** **77 Claims**

**1.** Azolyl-pentene derivative of the formula



I

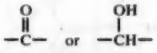
in which

R is $C_1$–$C_{10}$-alkyl or $C_3$–$C_8$-alkenyl,

$R_1$ is imidazol-1-yl or 1,2,4-triazol-1-yl,

$R_2$ is phenyl, 2-fluorophenyl, 4-fluorophenyl, 2-chlorophenyl, 3-chlorophenyl, 4-chlorophenyl, 4-bromophenyl, 2,4-dichlorophenyl, 3,4-dichlorophenyl, 2,6-dichlorophenyl, 2-methylphenyl, 4-methylphenyl, 4-methoxyphenyl, 4-nitrophenyl, 2-naphthyl, 2-pyridyl, 3-pyridyl, 2-thienyl or 2-furyl, and

Z is



and its acid addition salt with an inorganic or an organic acid.

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## 4,517,368
## 2,3-DICHLORO-5-IODOPYRIDINE AND METHODS OF MAKING AND USING THE SAME

**Richard L. Burson, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Sep. 6, 1983, Ser. No. 529,200**

**Int. Cl.³ C07D** *213/61*

**U.S. Cl. 546—303** **20 Claims**

**1.** 2,3-Dichloro-5-iodopyridine.

**6.** 2,3-Dichloro-5-lithiopyridine.

**14.** 3-Chloro-5-iodo-2-pyridinol.

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## 4,517,369
## PREPARATION OF MIXTURES RICH IN 3,4,5,6-TETRACHLORO-2-TRICHLOROMETHYL PYRIDINE

**Michael J. Marinak, Kelso, and John L. Simonson, Longview, both of Wash., assignors to Kalama Chemical, Inc., Kalama, Wash.**

**Filed Sep. 29, 1982, Ser. No. 426,916**

**Int. Cl.³ C07D** *213/61*

**U.S. Cl. 546—345** **4 Claims**

**1.** The process of producing a polychloro pyridine reaction product rich in 3,4,5,6-tetrachloro-2-trichloromethyl pyridine, said process comprising:

(a) charging a reactor means with an initial charge which contains 3,4,5-trichloro-2-trichloromethyl pyridine;

(b) adding ferric chloride catalyst to such initial charge, in the amount of at least about 3% by weight relative to the initial charge;

(c) while maintaining the catalyzed charge in the reactor at a temperature in the range of from about 170° C. to about 220° C., sparging chlorine through the charge at a rate

sufficient to maintain at least 50% excess chlorine in the gases from the reactor; and

(d) continuing chlorine addition and heating of the charge under the indicated conditions until substantial conversion of the charge to 3,4,5,6-tetrachloro-2-trichloromethyl pyridine occurs.

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**4,517,370**

## PROCESS FOR PREPARING 2-CHLOROBENZOXAZOLES

**Johannes Becherer, Maintal; Klaus Kühlein, Kelkheim, and Ulrich Kussmaul, Niederdorfelden, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

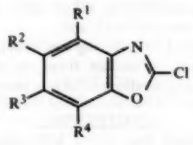
**Filed Feb. 18, 1983, Ser. No. 467,742**

**Claims priority, application Fed. Rep. of Germany, Feb. 27, 1982, 3207153**

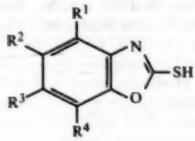
**Int. Cl.³ C07D** *263/54*

**U.S. Cl. 548—217** **11 Claims**

1. In the process for preparing 2-chlorobenzoxazoles of the formula



wherein each of $R^1$, $R^2$, $R^3$ and $R^4$ is independently of one another. H, chloro or alkyl having 1 to 4 carbon atoms, which comprises reacting chlorine with 2-mercaptobenzoxazoles of the formula



wherein the improvement comprises providing a melt of previously prepared 2-chloro-benzoxazole, adding the 2-mercaptobenzoxazole reactant to the 2-chlorobenzoxazole melt and simultaneously or subsequently passing chlorine into the melt, with the proviso that substituents $R^1$ to $R^4$ are identical in both the 2-chlorobenzoxazole melt and the 2-mercaptobenzoxazole reactant.

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**4,517,371**

## PROCESS FOR THE SYNTHESIS OF CARBOXYLIC ANHYDRIDES USING A VANADIUM, PHOSPHORUS OXYGEN CONTAINING CATALYST COMPOSITION

**Tai-Cheng Yang, Mahwah; Krishna K. Rao, Paterson, and I-Der Huang, Upper Saddle River, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Division of Ser. No. 326,543, Dec. 2, 1981, Pat. No. 4,392,986, which is a continuation-in-part of Ser. No. 309,725, Oct. 8, 1981, abandoned, which is a continuation of Ser. No. 202,262, Oct. 30, 1980, abandoned. This application May 9, 1983, Ser. No. 492,995**

**Int. Cl.³ C07D** *493/04, 307/89, 307/60*

**U.S. Cl. 549—239** **7 Claims**

1. A process for oxidizing in the vapor phase at least one feed hydrocarbon to a carboxylic anhydride, said feed hydrocarbon being selected from the group consisting of $C_4$ to $C_{10}$ alkane, $C_4$ to $C_{10}$ alkene, $C_4$ to $C_{14}$ cycloalkane, $C_4$ to $C_{14}$ cycloalkene, alkaryl hydrocarbon wherein the alkyl portion thereof contains from 1 to 10 carbons, and the aryl portion contains from 6 to 14 carbons, and mixtures thereof, which process comprises contacting the feed hydrocarbon, under conditions and in a manner to form at least one carboxylic anhydride, with a catalyst composition comprising vanadium, phosphorus, and oxygen, said catalyst composition prepared by the process which comprises:

(1) reacting in the presence of a liquid organic media, a vanadium containing compound present in said liquid organic media as a heterogeneous suspension, and a phosphorus containing compound, in a manner and under conditions sufficient to form in said liquid organic media a heterogeneous vanadium-phosphorus-oxygen containing first catalyst precursor composition having an atomic ratio of phosphorus to vanadium of from about 0.5:1 to about 2:1, and an average vanadium valence of from about 3.9 to about 4.7;

(2) separating said first catalyst precursor composition from said liquid organic media;

(3) treating said first catalyst precursor composition with at least one part by weight liquid water per part by weight first catalyst precursor composition at a temperature of at least about 30° C. for a period of at least about 0.5 hour to form a second vanadium-phosphorus-oxygen catalyst precursor composition;

(4) separating said second catalyst precursor composition from said water; and

(5) activating said second catalyst precursor composition in an atmosphere which excludes the presence of air alone therein.

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**4,517,372**

## PROCESS FOR THE PREPARATION OF 4-FLUOROPHTHALIC ANHYDRIDE

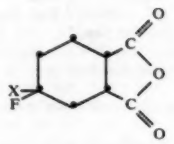
**David Y. Tang, E. Amherst, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.**

**Continuation-in-part of Ser. No. 493,849, May 12, 1983, abandoned. This application May 2, 1984, Ser. No. 604,272**

**Int. Cl.³ C07D** *307/89*

**U.S. Cl. 549—246** **20 Claims**

1. A process for preparing 4-fluorophthalic anhydride which comprises contacting a dihalohexahydrophthalic anhydride of the formula



where X is Cl or F with a dehydrogenation catalyst.

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**4,517,373**

## ISOMB-530B DERIVATIVES

**Akira Terahara, and Minoru Tanaka, both of Hiromachi, Japan, assignors to Sankyo Company, Limited, Tokyo, Japan**

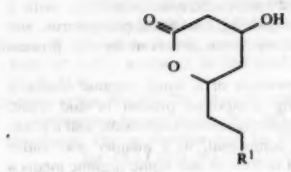
**Filed Aug. 24, 1982, Ser. No. 410,889**

**Claims priority, application Japan, Aug. 27, 1981, 56-134558**

**Int. Cl.³ C07D** *309/30*

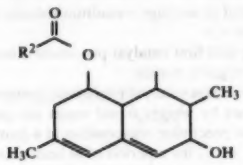
**U.S. Cl. 549—292** **3 Claims**

1. A 1-acyloxy-6-hydroxy-IsoMB-530B lactone of the formula (I):



(I)

wherein $R^1$ represents a group of the formula



wherein $R^2$ is a $C_1$–$C_{10}$ alkyl group.

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**4,517,374**

## CYCLOALKANE EPOXIDES PRODUCED BY AIR OXIDATION OF CYCLOALKENES OVER OXIDE CATALYSTS

**John R. Sanderson; Lewis W. Watts, Jr., and Terry L. Renken, all of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Jul. 1, 1983, Ser. No. 510,142**
**Int. Cl.³ C07D *301/06***
**U.S. Cl. 549—533** **2 Claims**

1. A method for the production of cyclododecane epoxide comprising

reacting cyclododecene with oxygen in the presence of zinc oxide as catalyst where acetic acid is also present under a temperature in the range of about 50° to 150° C.

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**4,517,375**

## STABLE AQUEOUS IMPREGNATING SOLUTIONS PREPARED FROM HYDROLYZED ALKYLTRIALKOXYSILANES

**Werner Schmidt, St. Augustin, Fed. Rep. of Germany, assignor to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany**

**Division of Ser. No. 304,480, Sep. 22, 1981, Pat. No. 4,352,894. This application May 7, 1982, Ser. No. 375,941**
**Claims priority, application Fed. Rep. of Germany, Oct. 2, 1980, 3037220**
**Int. Cl.³ C07F *7/08, 7/18***
**U.S. Cl. 556—463** **5 Claims**

1. Stable aqueous solution of hydrolyzed alkyltrialkoxysilanes wherein the solution has a pH value from 2 to 7.

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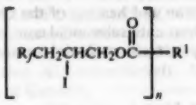
**4,517,376**

## MANUFACTURE OF CHLOROMETHYL-SUBSTITUTED POLYFLUOROALKYL ESTERS

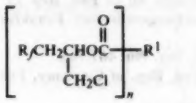
**Stanley E. Krahler, and William R. Remington, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 338,617, Jan. 11, 1982, abandoned, which is a continuation-in-part of Ser. No. 39,162, May 15, 1979, abandoned. This application Aug. 23, 1982, Ser. No. 410,516**
**Int. Cl.³ C07C *69/76***
**U.S. Cl. 560—87** **10 Claims**

1. A process which comprises reacting chlorine with a reactant compound having the formula:



so as to produce an end-product compound having the formula:



wherein

$R_f$ is a saturated, monovalent, nonaromatic fluorinated aliphatic which is straight or branched chain or cyclic and contains at least 3 carbons;

$R^1$ is optionally substituted alkyl, aryl, alkenyl, aralkyl, cycloalkyl, or cycloalkenyl; and

n is a number from 1 to 4; during said reaction, said reactant compound being in molten form or dissolved or suspended in a liquid medium which is inert under the reaction conditions.

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**4,517,377**

## PROCESS FOR PRODUCING VINYL ACETATE

**Tomiya Isshiki; Takanari Nawata, both of Tokyo; Yasuhiko Kijima; Akira Ito, both of Chiba, and Takayuki Watanabe, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Filed Jun. 18, 1982, Ser. No. 390,074**
**Claims priority, application Japan, Jun. 22, 1981, 56-96296**
**Int. Cl.³ C07C *67/297, 69/15***
**U.S. Cl. 560—261** **18 Claims**

1. A process for producing vinyl acetate which comprises decomposing ethylidene diacetate in a liquid phase at a temperature within the range of 80° to 250° C. in the presence of at least one halide compound selected from the group consisting of:

(a) metal halides selected from the group consisting of bromides and iodides of metals, and mixtures thereof, said metal being selected from the group consisting of Li, Mg, Ca, Sr, Ba, Zn, Sn and Sb;

(b) organic halides represented by $R^1Xp$ wherein $R^1$ is selected from alkyl having 1–10 carbon atoms, cycloalkyl having 3–10 carbon atoms or aromatic hydrocarbon having 6–10 carbon atoms, X is selected from I, Br, F or Cl and p is an integer of 1–3;

(c) organic halides represented by $R^2COX$ wherein $R^2$ is selected from alkyl having 1–10 carbon atoms, cycloalkyl having 3–10 carbon atoms or aryl, and X is as defined above; and

(d) onium salts of (i) a nitrogen group compound and (ii) HX wherein X is as defined above, or a halide represented by $R^1Xp$ or $R^2COX$ wherein X, $R^1$, $R^2$ and p are as defined above.

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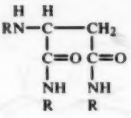
**4,517,378**

## CURING AGENT FOR FLUOROCARBON POLYMER COATING COMPOSITIONS

**Joseph A. Vasta, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jun. 30, 1983, Ser. No. 509,705**
**Int. Cl.³ C07C *102/06, 103/87, 103/10***
**U.S. Cl. 564—160** **5 Claims**

1. A curing agent for fluorocarbon polymers consisting of



wherein R is $R^1NH_2$ and $R^1$ is an aliphatic or cycloaliphatic hydrocarbon radical.

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**4,517,379**

## BRANCHED AMIDES OF L-ASPARTYL-D-AMINO ACID DIPEPTIDES

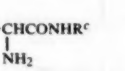
**Thomas M. Brennan, Old Lyme, and Michael E. Hendrick, Groton, both of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 276,243, Jun. 26, 1981, Pat. No. 4,399,163, which is a continuation-in-part of Ser. No. 201,745, Nov. 5, 1980, Pat. No. 4,411,925, which is a continuation-in-part of Ser. No. 113,800, Jan. 21, 1980, abandoned. This application Apr. 1, 1983, Ser. No. 481,456**

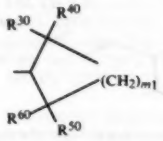
**Int. Cl.³ C07C** *103/37, 103/52*

**U.S. Cl. 564—193** **17 Claims**

1. A D-amino acid amide compound of the formula



wherein $R^a$ is $CH_2OH$ or $CH_2OCH_3$, and $R^c$ is a member selected from the group consisting of fenchyl, diisopropylcarbinyl, d-methyl-t-butylcarbinyl, d-ethyl-t-butylcarbinyl, di-t-butylcarbinyl, cyclopropyl-t-butylcarbinyl, cyclopentyl-t-butylcarbinyl, dicyclopropylcarbinyl,



where $m_1$ is 1, 2 or 3 and when $m_1$ is 1: $R^{30}$, $R^{40}$, $R^{50}$ and $R^{60}$ are each methyl, when $m_1$ is 2: $R^{30}$ is methyl, ethyl or isopropyl and

$R^{40}$, $R^{50}$ and $R^{60}$ are each hydrogen, or $R^{30}$, and $R^{50}$ are each methyl and $R^{40}$ and $R^{60}$ are each hydrogen, and when $m_1$ is 3:

(a) $R^{30}$ is isopropyl or t-butyl and $R^{40}$, $R^{50}$ and $R^{60}$ are each hydrogen,

(b) $R^{30}$ is ethyl, $R^{50}$ is methyl and $R^{40}$ and $R^{60}$ are each hydrogen or

(c) $R^{30}$, and $R^{50}$ and $R^{40}$ are each methyl and $R^{60}$ is hydrogen or methyl.

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**4,517,380**

## METHOD FOR PURIFYING METHACRYLAMIDOPROPYL TRIMETHYLAMMONIUM CHLORIDE AND RELATED COMPOUNDS

**Peter J. Arndt, Seeheim-Jugenheim; Manfred Müller, Rossdorf; Fritz Schlosser, and Franz Wenzel, both of Darmstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany**

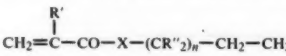
**Filed Jun. 29, 1984, Ser. No. 626,443**

**Claims priority, application Fed. Rep. of Germany, Aug. 5, 1983, 3328350**

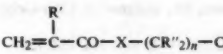
**Int. Cl.³ C07C** *103/44*

**U.S. Cl. 564—206** **2 Claims**

1. A method for purifying a compound of the formula



by the removal of impurities therefrom, including an impurity of the formula



wherein R is the same or different alkyl, R′ is hydrogen or methyl, R″ is hydrogen or lower alkyl, X is oxygen or —NH—, $A^-$ is an anion of an acid, and n is an integer from 0 to 3, which method comprises extracting an aqueous solution of said compound with dichloromethane.

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**4,517,381**

## 2-METHYL-4′-ISOPROPYL-2-PENTENOYL ANILIDE

**Tetsuo Takematsu, Utsunomiya; Mitihiko Nakaya, Mobara; Koichi Moriyasu, Yokohama, and Nobuo Komoto, Mitaka, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan**

**Filed Jul. 11, 1984, Ser. No. 629,605**

**Claims priority, application Japan, Jul. 19, 1983, 58-130161**

**Int. Cl.³ C07C** *102/04, 102/06, 103/133;* **A01N** *9/20*

**U.S. Cl. 564—207** **4 Claims**

1. 2-Methyl-4′-isopropyl-2-pentenoyl anilide.

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**4,517,382**

## 1-FORMYL-TRI- AND TETRAMETHYL-CYCLOHEX-1-EN-3-ONE OXIMES

**Lothar Janitschke, Kleinniedesheim, and Werner Hoffmann, Neuhofen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Sep. 16, 1982, Ser. No. 418,605**

**Claims priority, application Fed. Rep. of Germany, Sep. 23, 1981, 3137802**

**Int. Cl.³ C07C** *131/10*

**U.S. Cl. 564—267** **2 Claims**

1. 1-Formyl-2,6,6-trimethyl-3-oximido-cyclohex-1-ene.

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**4,517,383**

## ALKYLENE OXIDE ADDUCTS OF ANILINE HAVING REDUCED VISCOSITY

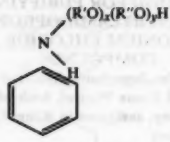
**Alexander Korczak, Grosse Ile, and William W. Levis, Jr., Wyandotte, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Jul. 5, 1983, Ser. No. 510,441**

**Int. Cl.³ C07C** *93/00*

**U.S. Cl. 564—443** **9 Claims**

1. A cogeneric mixture of compounds having the following structural formula:



wherein

R′ and R″ are alkylene radicals which may be the same or different having from 2 to 4 carbon atoms;

x is an integer from 0 to 50;

y is an integer from 0 to 50; and

x+y must be greater than 1 and less than 50.

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**4,517,384**

## PERFLUOROALKYL ALKYLENE VINYL SULFOXIDES AND SULFONES

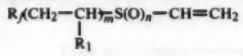
**Neal O. Brace, Wheaton, Ill., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Jan. 21, 1983, Ser. No. 459,739**

**Int. Cl.³ C07C *147/02, 149/06***

**U.S. Cl. 568—27** **4 Claims**

1. A compound of the formula



wherein

$R_f$ is perfluoroalkyl of 4 to 12 carbon atoms,

$R_1$ is hydrogen,

m is 1, and

n is 1 or 2.

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**4,517,385**

## PROCESS FOR PRODUCING SOLANONE, NORSOLANADIONE AND INTERMEDIATES THEREFOR

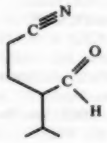
**Kenneth K. Light, North Ogden, Utah; William L. Schreiber, Jackson, N.J.; Joseph A. McGhie, Montclair, N.J.; Ronald P. Schreck, Old Bridge, N.J.; Takao Yoshida, West Long Branch, N.J.; Loren B. Schreiber, Aberdeen, N.J., and Ranya Muralidhara, Fair Haven, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

**Division of Ser. No. 511,966, Jul. 8, 1983, Pat. No. 4,483,995, which is a division of Ser. No. 357,158, Mar. 11, 1982, Pat. No. 4,412,083. This application Jul. 31, 1984, Ser. No. 636,226**

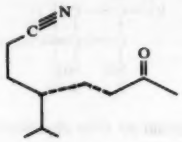
**Int. Cl.³ C07C *49/16, 49/12***

**U.S. Cl. 568—386** **1 Claim**

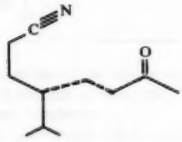
1. A process for forming norsolanadione comprising the steps of reacting a compound having the structure:



with acetone in the presence of base to form at least one compound defined according to the structure:

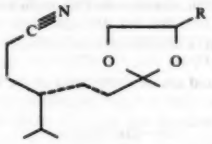


wherein one of the dashed lines is a carbon-carbon double bond and the other of the dashed lines is a carbon-carbon single bond; reacting one of the compounds having the structure:

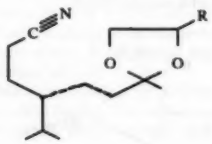


with an alkylene glycol having the structure:

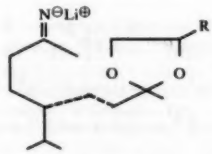
to form a ketal having the structure:



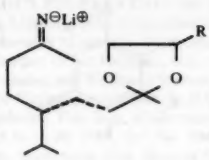
wherein R represents hydrogen or $C_1$–$C_4$ alkyl and one of the dashed lines represents a carbon-carbon double bond and the other of the dashed lines represents a carbon-carbon single bond; reacting at least one of the ketals having the structure:



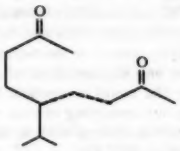
with methyl lithium in order to form the organometallic compound having the structure:



reacting the organometallic compound having the structure:



with aqueous acid in order to form the norsolanadione having a structure defined according to the genus:



wherein the dashed lines are as defined above.

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**4,517,386**

**PROCESS FOR THE REARRANGEMENT OF EPOXIDES**

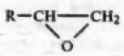
**Richard E. Naipawer, Wallington, and Alan J. Chalk, Kinnelon, both of N.J., assignors to Givaudan Corporation, Clifton, N.J.**

**Filed May 11, 1984, Ser. No. 609,403**

**Int. Cl.[3] C07C *45/58***

**U.S. Cl. 568—483** **7 Claims**

1. A process for the preparation of an aldehyde of the formula R—$CH_2CHO$ wherein R is an alkyl group of from three to eighteen carbon atoms which comprises adding an epoxide of the formula



to a mixture of lithium tetrafluoroborate and a polyether at a temperature between 80° C. and 200° C. and isolating the aldehyde formed therefrom.

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**4,517,387**

**PROCESS FOR PRODUCTION OF 2,2-BIS(4-HYDROXYPHENYL) PROPANE**

**Fujihisa Matsunaga; Tadahiko Nishimura, both of Iwakuni; Etsuo Miyake, and Kiyotaka Banba, both of Wakayama, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd. and Honshu Chemical Ind. Co. Ltd., both of Tokyo, Japan**

**Filed Sep. 26, 1983, Ser. No. 536,029**

**Claims priority, application Japan, Sep. 30, 1982, 57-169858; Sep. 30, 1982, 57-169859; Sep. 30, 1982, 57-169860**

**Int. Cl.[3] C07C *39/16***

**U.S. Cl. 568—728** **6 Claims**

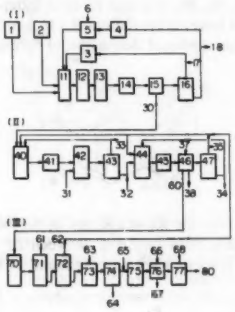
1. A process for continuously producing high quality 2,2-bis(4-hydroxyphenyl)propane from a reaction of phenol and acetone in the presence of a hydrochloric acid containing catalyst comprising the steps of:

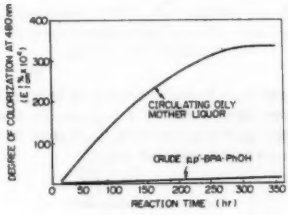
(A) carrying out said reaction by continuously charging additional phenol, the below-mentioned circulating phenol, additional acetone, additional hydrogen chloride or hydrochloric acid, the below-mentioned circulating oily mother liquor, and the below-mentioned aqueous phase mother liquid, into a reactor to form a reaction mixture slurry comprising the crude phenol adduct of 2,2-bis(4-hydroxyphenyl)propane in the form of crystal and two liquid phase reaction mother liquors of an oily mother liquor and an aqueous mother liquor;

(B) separating said reaction mixture slurry into the crude phenol adduct of 2,2-bis(4-hydroxyphenyl)propane and the two liquid phase mother liquors after discharging the reacting mixture slurry from the reactor;

(C) separating said two liquid phase mother liquors obtained in the above-mentioned step (B) into the oily mother liquor and the aqueous mother liquor, whereby the oily mother liquor is circulated as a circulating oily mother liquor to the reactor and the remaining portion of the aqueous mother liquor, after discharging a portion thereof, is circulated as a circulating aqueous mother liquor to the reactor;

(D) dissolving said crude phenol adduct of 2,2-bis(4-hydroxyphenyl)propane obtained in the above-mentioned step (B) in a phenol solvent and, after neutralizing the hydrogen chloride or hydrochloric acid contained in the crude phenol adduct with a base, crystallizing and separating the phenol adduct of 2,2-bis(4-hydroxyphenyl)propane from the solution to obtain the purified phenol adduct of 2,2-bis(4-hydroxyphenyl)propane;




(E) decomposing said purified phenol adduct of 2,2-bis(4-hydroxyphenyl)propane obtained in the above-mentioned step (D), on heating, at a temperature in the range of 100° C. to 200° C. and a pressure of 1 to 500 mm Hg, to form a thermally decomposed product containing phenol and 2,2-bis(4-hydroxyphenyl)propane;

(F) recovering the phenol and 2,2-bis(4-hydroxyphenyl)propane from said thermally decomposed product obtained in the above-mentioned step (E); and

(G) circulating said phenol recovered in the above-mentioned step (F) to a reactor in the above-mentioned step (A) as a circulating phenol or to the above-mentioned step (D) as a phenol solvent.

**4,517,388**

## PROCESS FOR THE SELECTIVE PREPARATION OF PARABROMOPHENOL AND ITS DERIVATIVES

**Samuel Braverman, 65/26 Harey-Yehuda St., Ganei Tiqva 55900, Israel**

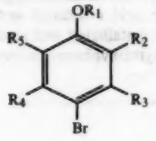
**Filed Oct. 25, 1983, Ser. No. 545,212**

**Claims priority, application Israel, Oct. 29, 1982, 67117**

**Int. Cl.³ C07C *39/27***

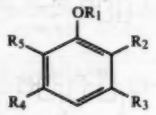
**U.S. Cl. 568—779** **7 Claims**

1. A process for the preparation of para-bromophenol derivatives of formula I



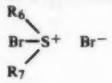
I

wherein $R_1$, $R_2$, $R_3$, $R_4$, and $R_5$ each independently represent hydrogen or lower alkyl radical of 1 to 6 carbon atoms, characterized in that a phenol derivative of formula II



II

wherein $R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ are as defined above is reacted preferably at a temperature of between 20° and 30° C., in the presence of a solvent with a compound of the formula



III

or with bromine and a compound of the formula

IV

wherein $R_6$ and $R_7$ in formulae III and IV being each independently a lower alkyl radical of 1 to 6 carbon atoms, an aryl radical or they form together with the S-atom to which they are attached a 4 to 6 membered ring.

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**4,517,389**

## PROCESS FOR METHYLATING THE ORTHO POSITION OF A PHENOL

**Tsutomu Katsumata, and Masahisa Yokota, both of Kanagawa, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

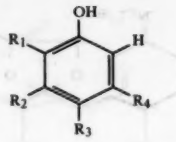
**Filed Aug. 8, 1983, Ser. No. 521,205**

**Claims priority, application Japan, Aug. 10, 1982, 57-137931; Sep. 3, 1982, 57-152675; Oct. 5, 1982, 57-173852; Feb. 7, 1983, 58-18573**

**Int. Cl.³ C07C *37/16***

**U.S. Cl. 568—804** **3 Claims**

1. A process for methylating a phenol at the ortho position which comprises flowing a gaseous stream containing methanol and a phenol having the general formula



wherein $R_1$, $R_2$, $R_3$ and $R_4$ each independently represent a saturated aliphatic hydrocarbon substituent selected from the group consisting of hydrogen, methyl, ethyl, isopropyl and tertiary butyl, through a fluidized bed, operated at a temperature of 250° to 600° C., of particles of a catalyst comprising 30 to 70% by weight of silica and 70 to 30% by weight of a metal oxide having a catalytic activity in the methylation of the ortho position of a phenol and supported on said silica, said metal oxide containing as the metal component at least one metal selected from the group consisting of iron, vanadium, manganese, magnesium, chromium and indium, said catalyst having been calcined at 500° to 900° C.

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**4,517,390**

## HYDROGENATION OF OLEFINS AND ALDEHYDES

**Michael J. H. Russell, Reading, and Barry A. Murrer, Henley on Thames, both of England, assignors to Johnson Matthey Public Limited Company, London, England**

**Continuation of Ser. No. 361,051, Mar. 23, 1982, abandoned. This application Feb. 21, 1984, Ser. No. 580,294**

**Claims priority, application United Kingdom, Mar. 25, 1981, 8109303**

**Int. Cl.³ C07C *29/14, 5/03***

**U.S. Cl. 568—881** **4 Claims**

1. A catalytic process for the hydrogenation of an unsaturated organic compound selected from (a) the group consisting of open-chain olefins having from 3 to 20 carbon atoms and cyclic olefins to produce the corresponding alkene, (b) styrenes to produce the corresponding alkyl benzenes, (c) styrene-butadiene copolymers to selectively hydrogenate the olefinic groups, and (d) aliphatic aldehydes to produce the corresponding alcohols comprising reacting together the said compound and hydrogen in the presence of a catalyst comprising a water-soluble complex of a platinum group metal containing as a ligand therein a water-soluble phosphine selected from carboxy-triaryl phosphines and hydroxy-triaryl phosphines in a reaction medium comprising an aqueous phase and an organic phase, wherein the reaction medium also includes an amphiphilic reagent, the aqueous phase contains the catalyst and the organic phase contains the said compound, the amphiphilic reagent containing polar and non-polar moieties and being substantially soluble in the aqueous phase and substantially insoluble in the organic phase, the reaction temperature being in the range 40°–150° C., the initial reaction pressure being in the range 100–10,000 kPa, the pH of the aqueous phase being sufficiently high to solubilize the water-soluble complex, the ratio of aqueous phase to organic phase being in the range 0.33 to 5:1, the concentration of amphiphilic reagent to platinum group metal being up to 100:1 on a molar basis and the concentration of the platinum group metal being in the range 100 to 500 ppm based on the aqueous phase.

4,517,391

## CONTINUOUS PREPARATION OF ETHANOL

Schuster, Ludwig, Limburgerhof; Franz-Josef Mueller, Wachenheim; Axel Anderlohr, Mannheim; Peter Blei, Bad Durkheim; Gerhart Eigenberger; Bernd Höppner, both of Neustadt; Gerd Kaibel, Lampertheim, and Wolfgang Steiner, Friedelsheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 20, 1983, Ser. No. 496,573

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1982, 3221077

Int. Cl.³ C07C *29/136, 31/08*

U.S. Cl. 568—885 13 Claims

1. In a process for the continuous catalytic preparation of ethanol by hydrogenating acetic acid under superatmospheric pressure and at an elevated temperature, the improvement which comprises:

carrying out the hydrogenation in a reactor using a catalyst consisting of: either

(a) Cobalt;

(b) Cobalt and an essentially inert carrier;

(c) No less than 50% Cobalt plus one or more members selected from the group consisting of copper manganese, molybdenum, chromium and phosphoric acid; or

(d) an essentially inert carrier and an active component which is no less than 50% cobalt plus one or more members selected from the group consisting of copper manganese, molybdenum, chromium and phosphooric acid; and

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4,517,392

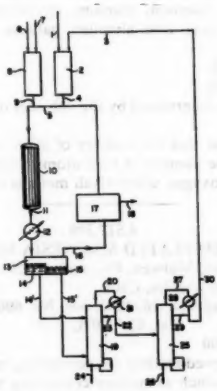
## PREPARATION OF NITRO COMPOUNDS BY VAPOR PHASE NITRATION OF ORGANIC ALCOHOLS

Shu-Chieh P. Wang, Columbia, and Martin B. Sherwin, Potomac, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 510,860, Jul. 5, 1983, abandoned. This application Dec. 19, 1983, Ser. No. 563,215

Int. Cl.³ C07C *79/02*

U.S. Cl. 568—948 19 Claims



1. A process for selectively forming nitroalkanes comprising contacting, in a reaction zone in a homogeneous gas phase and at an elevated pressure of about 5 to 20 bars, a elevated temperature of from about 100° C. to about 500° C. and a time of from about 0.5 to 20 seconds, at least one $C_2$–$C_{10}$ organic aliphatic alcohol with $NO_2$ and recovering the formed nitro compound.

4,517,393

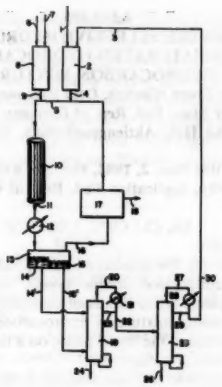
## PREPARATION OF NITRO COMPOUNDS BY VAPOR PHASE NITRATION OF KETONES

Shu-Shieh P. Wang, Columbia, and Martin B. Sherwin, Potomac, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 510,860, Jul. 5, 1983, abandoned. This application Dec. 19, 1983, Ser. No. 563,208

Int. Cl.³ C07C *79/02*

U.S. Cl. 568—948 27 Claims



1. A process for selectively forming nitroalkanes comprising contacting in a reaction zone in a homogeneous gas phase and at an elevated pressure of about 5 to 20 bars, a temperature of from about 100° C. to about 500° C. and a time of from 0.5 to 20 seconds, a $C_3$–$C_{10}$ aliphatic ketone with nitrogen dioxide and recovering the formed nitroalkane compound.

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4,517,394

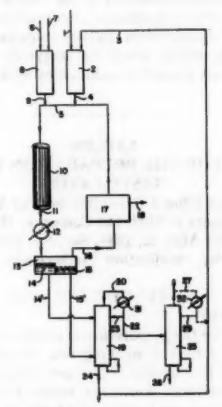
## PREPARATION OF NITRO COMPOUNDS BY VAPOR PHASE NITRATION OF CARBOXYLIC ACIDS

Shu-Chieh P. Wang, Columbia, and Martin B. Sherwin, Potomac, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 510,858, Jul. 5, 1983, abandoned. This application Dec. 19, 1983, Ser. No. 563,216

Int. Cl.³ C07C *79/02*

U.S. Cl. 568—948 25 Claims



1. A process for selectively forming nitroalkanes and nitroar-

omatics comprising contacting in a reaction zone a homogeneous gas phase of a carboxylic acid selected from $C_2$–$C_{10}$ aliphatic monocarboxylic acids, $C_3$–$C_{10}$ dicarboxylic acids, aromatic carboxylic acids composed of a phenyl group attached to the carboxylic acid group via a $C_1$–$C_3$ alkylene group and mixtures thereof and $NO_2$under the pressure of from about 1 to 20 bars, a temperature of from about 200° C. to about 500° C. and a time to have the Reaction Condition Product (RCP) of pressure (in bars) and time (in seconds) to be at least 3, and recovering the formed nitro compound.

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**4,517,395**

## PROCESS FOR THE SELECTIVE HYDROGENATION OF POLYUNSATURATED HYDROCARBONS IN HYDROCARBON MIXTURES

**Fritz Obenaus; Franz Nierlich; Otto Reitemeyer, and Bernhard Scholz, all of Marl, Fed. Rep. of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany**

**Filed Nov. 2, 1982, Ser. No. 438,465**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1981, 3143647**

**Int. Cl.³ C07C *5/03, 5/08***

**U.S. Cl. 585—259** **12 Claims**

1. A process for the selective hydrogenation of hydrocarbons having conjugated double bonds, cumulative double bonds or acetylenic triple bonds or combinations thereof in a monoene-containing mixture of hydrocarbons having at least three carbon atoms in the liquid phase on a fixed catalyst on an inert support, which comprises:

adding hydrogen to the hydrocarbon mixture to be hydrogenated, in a finely divided form and in such quantitative ratios that the hydrogen is completely dissolved in the hydrocarbon mixture and a homogeneous liquid phase is obtained before the hydrocarbon mixture enters a hydrogenation zone, said hydrogen being added in an amount from once to twice the stoichiometric quantity for effecting the hydrogenation of the polyunsaturated and acetylenic compounds to the corresponding monoenes;

adding carbon monoxide to the hydrocarbon mixture to be hydrogenated, in a finely divided form, wherein the carbon monoxide is completely dissolved in the hydrocarbon mixture and a homogeneous liquid phase is obtained before the hydrocarbon mixture enters the hydrogenation zone, and wherein the proportion of carbon monoxide amounts to at least 0.05 ppm by weight based on the weight of the hydrocarbon mixture; and

passing the resulting reaction mixture in the liquid phase over a fixed catalyst containing 0.01 to 3% by weight of palladium, based on the weight of the support in a hydrogenation zone maintained at the reaction conditions required for effecting selective hydrogenation whereby the content of hydrocarbons having conjugated double bonds cumulative double bonds or acetylenic triple bonds or combinations thereof is reduced by said selective hydrogenation.

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**4,517,396**

## PROCESS FOR THE PREPARATION OF MIDDLE DISTILLATES

**Arend Hoek, and Eduard P. Kieffer, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed May 15, 1984, Ser. No. 610,543**

**Claims priority, application Netherlands, May 17, 1983, 8301747**

**Int. Cl.³ C07C *3/03, 3/10***

**U.S. Cl. 585—415** **14 Claims**

1. A process for the preparation of middle distillates, characterized in that a feed comprising one or more mono-olefins having at most five carbon atoms per molecule, or aliphatic hydrocarbon mixtures consisting more than 50%w of said olefins, is contacted at a temperature between 175° and 250° C. with a catalyst comprising a crystalline metal silicate which after one hour's calcination in air at 500° C. has the following properties:

(a) an X-ray powder diffraction pattern which the strongest lines are the four lines mentioned in Table A,

TABLE A

| d(Å) |
|---|
| 11.1 ± 0.2 |
| 10.0 ± 0.2 |
| 3.84 ± 0.07 |
| 3.72 ± 0.06; and |

(b) in addition to $SiO_2$, one or more oxides of a trivalent metal A chosen from aluminum, iron, gallium, rhodium, chromium and scandium are present, and in which the $SiO_2/A_2O_3$ molar ratio is higher than 10;

which metal silicate comprises at least 0.1%w nickel and/or cobalt which has been deposited thereon by means of ion exchange.

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**4,517,397**

## OXIDATIVE DIMERIZATION OF TOLUENE

**Takashi Terauchi, Iwaki; Koji Sato, Kita-Ibaraki, and Shoichi Hoshi, Iwaki, all of Japan, assignors to Kureha Kaguku Kogyo Kabushiki Kaisha, Nihonbashi, Japan**

**Division of Ser. No. 450,649, Dec. 17, 1982, Pat. No. 4,460,705. This application Jan. 24, 1984, Ser. No. 573,328**

**Claims priority, application Japan, Dec. 29, 1981, 56–214257**

**Int. Cl.³ C07C *3/02***

**U.S. Cl. 585—428** **3 Claims**

1. A process for producing 1,2-diphenylethane and 1,2-diphenylethylene by the oxidative dimerization of toluene, comprising reacting toluene at a temperature of 400° to 650° C. in the presence of a catalyst comprising a composition represented by the general formula:

$$Tl_1M_aM'_bO_c$$

wherein

M represents at least one element selected from the group consisting of beryllium, magnesium, calcium, strontium and barium; M′ represents at least one element selected from the group consisting of lithium, sodium, potassium, rubidium, cesium, scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, titanium, zirconium, hafnium, niobium, tantalum, zinc, alumium, gallium, indium and antimony;

a is 0.05 to 15;

b is 0.05 to 15;

c is a number determined by the valences of thallium, M and M′;

with the proviso that the number of alkali metal atoms is at most 20% of the number of total atoms constituting the catalyst except for oxygen when alkali metal is included in M′.

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**4,517,398**

## HYDROXYLATED MAGNESIA SUPPORT

**John A. Sofranko, Malvern, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Apr. 16, 1984, Ser. No. 600,940**

**Int. Cl.³ C07C *2/00***

**U.S. Cl. 585—500** **15 Claims**

1. In an improved method for converting methane to higher hydrocarbons which comprises contacting a gas comprising methane with a contact agent comprising: (a) at least one reducible oxide of at least one metal, which oxide when with methane at a temperature within the range of about 500° to 1000° C. is reduced and produces higher hydrocarbon products and water, and (b) a support comprising a magnesia derived from magnesium hydroxide or from a magnesium-containing component contacted with hydroxyl-containing mate-

rial; the improvement which comprises employing a contact agent wherein said support has been calcined prior to the addition of said reducible metal oxide.

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**4,517,399**

## PROCESS FOR THE PRODUCTION OF HIGH VISCOSITY INDEX LUBRICATING OILS FROM OLEFINS

**Arthur W. Chester, Cherry Hill; William E. Garwood, Haddonfield, both of N.J., and Albert B. Schwartz, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation of Ser. No. 492,855, May 9, 1983, abandoned, which is a continuation-in-part of Ser. No. 359,964, Mar. 19, 1982, abandoned. This application Aug. 9, 1984, Ser. No. 639,529**

**Int. Cl.³ C07C *3/10***

**U.S. Cl. 585—533** **11 Claims**

1. In a process for the production of lubricating oils from olefins wherein olefins are contacted over a ZSM-5 type zeolite at a temperature range of from 350° to 650° F., a pressure of from 1,000 to 5,000 psig and a space velocity from 0.1 to 10 WHSV in order to obtain a liquid product from which said lubricating oils boiling above about 600° F. are separated, the improvement which comprises utilizing said ZSM-5 type zeolite in a crystalline size greater than 2 microns.

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**4,517,400**

## DECARBONYLATION OF N-BUTYRALDEHYDE USING ZEOLITE CATALYSTS

**Frederick A. Pesa, 764 Circlewood Dr., Aurora, Ohio 44202; Marcus W. Blaskie, 19007 Chagrin Blvd., Shaker Heights, Ohio 44122, and Joseph R. Fox, 32167 Hamilton Dr., Solon, Ohio 44139**

**Division of Ser. No. 376,331, May 10, 1982, abandoned. This application Jun. 27, 1983, Ser. No. 508,352**

**Int. Cl.³ C07C *1/00***

**U.S. Cl. 585—638** **13 Claims**

1. A process for selectively decarbonylating an n-aldehyde from a mixture comprising n-aldehydes and branched aldehydes to an olefin having one less carbon atom than the n-aldehyde, carbon oxide and hydrogen by passing the mixture over a catalyst comprising a metal selected from the group consisting of palladium, platinum, rhodium, copper, silver, gold and zinc, the metal being supported on or exchanged onto a zeolite.

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**4,517,401**

## OLEFIN METATHESIS AND CATALYST

**Simon G. Kukes, and Robert L. Banks, both of Bartlesville, Okla., assignors to Phillips Petroleum Co., Bartlesville, Okla.**

**Filed Jul. 26, 1983, Ser. No. 517,298**

**Int. Cl.³ C07C *6/00***

**U.S. Cl. 585—645** **10 Claims**

1. A process for disproportionating olefins comprising contacting at least one feed olefin having at least 3 carbon atoms per molecule under suitable reaction conditions which convert the feed olefin into other olefins having different numbers of carbon atoms with a catalytically effective amount of a catalyst composition comprising an inorganic refractory oxide and at least one metal oxide selected from molybdenum oxide and tungsten oxide promoted with an effective promoting amount of a methylating agent.

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**4,517,402**

## SELECTIVE SORPTION OF LINEAR ALIPHATIC COMPOUNDS BY ZEOLITES

**Ralph M. Dessau, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 307,045, Sep. 30, 1981, abandoned, which is a continuation-in-part of Ser. No. 105,190, Dec. 19, 1979, Pat. No. 4,309,281. This application May 2, 1983, Ser. No. 490,910**

**Int. Cl.³ C07C *7/13***

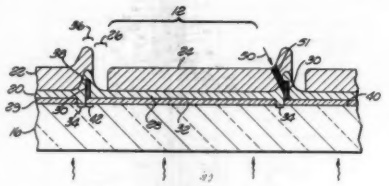
**U.S. Cl. 585—820** **8 Claims**

1. A process for selective separation of a linear paraffin compound in admixture with at least one branched paraffin compound, said compounds having a critical dimension of less than 6.8 Angstrom Units for sorption, which comprises contacting the mixture of paraffins with zeolite ZSM-11, said zeolite being characterized by a silica:alumina mole ratio of at least 12, to effect selective sorption of said linear paraffin by said zeolite.

## 4,517,403
## SERIES CONNECTED SOLAR CELLS AND METHOD OF FORMATION

Don L. Morel, Woodland Hills; Robert R. Gay, Granada Hills, and Gary B. Turner, Canoga Park, all of Calif., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed May 16, 1983, Ser. No. 495,198
Int. Cl.[3] H01L *31/06, 31/18*
U.S. Cl. 136—249 14 Claims



1. A photovoltaic device comprising:

a continuous thin film having front and back major surfaces and a plurality of spaced photovoltaic regions thereon;

transparent electrode means at the front surface having a plurality of discrete front electrode portions formed prior to formation of the continuous film and substantially coextensive with the respective photovoltaic regions;

other electrode means at the back surface having a plurality of discrete back electrode portions substantially coextensive with the respective photovoltaic regions;

each front electrode portion including at least one contact portion which is substantially thicker than said film and overlaps the back electrode portion of an adjacent photovoltaic region at a preselected area to establish electrical connection with said back electrode through the continuous film.

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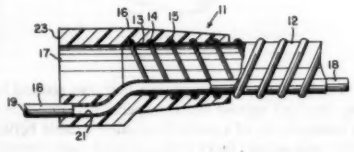
## 4,517,404
## MULTIPLE FLUID CONVEYING HOSE ASSEMBLY AND METHOD OF MAKING SAME

William E. Hughes, Dayton; Keith E. Dare, Powell, both of Ohio, and Jerry W. Cooper, Haywood County, N.C., assignors to Dayco Corporation, Dayton, Ohio

Filed Feb. 2, 1983, Ser. No. 463,354
Int. Cl.[3] A47L *9/24;* F16L *11/12*
U.S. Cl. 174—47 7 Claims



1. A multiple fluid conveying hose assembly comprising of first hose having a tubular wall defining a passage internally thereof and axially spaced helical reinforcing coils for said tubular wall, a second hose linearly positioned within said passage of said first hose, and a connector on at least one end of said first hose having an end wall at right angles to the longitudinal axis of said first hose, said second hose being coextensive with the entire length of said first hose and said connector and passing through said end wall of said connector to the exterior of said first hose and having an outlet separate from the outlet of said first hose.

6. The method of making a multiple fluid conveying hose assembly comprising the steps of forming a first hose having an internal passage, locating axially spaced helical reinforcing coils within said first hose, said coils providing electrical continuity throughout the length of said hose; providing a connector having an end wall and an outer wall surrounding at least one end of said hose, placing electrical connection means within said connector and interconnecting said coils and said electrical connection means; positioning a second hose within said passage of said first hose and coextensive with the entire length of said first hose and said connector, and passing said second hose through said end wall of said connector to the exterior of said first hose.

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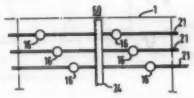
## 4,517,405
## COMPACT CONDUCTOR DEVICE

Nobuo Masaki, Fuchu, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed May 24, 1982, Ser. No. 381,448
Claims priority, application Japan, Jun. 24, 1981, 56-96474
Int. Cl.[3] H02G *5/00;* H02B *1/20, 13/06*
U.S. Cl. 174—68 B 7 Claims



1. A compact conductor device comprising:

a plurality of conductors of a predetermined size extending mutually in parallel, said conductors being spaced apart from one another by a minimum interphase distance A that is sufficient to prevent any electrical interflow through the air separating the conductors;

a plurality of insulators;

each of said conductors being supported at two predetermined points by a pair of said insulators spaced apart from each other along the longitudinal direction of the conductor, each conductor because of its size, inherent properties and the predetermined points of support having a maximum bending point beyond which plastic deformation of the conductor will occur;

an insulating member positioned along the length of said conductors and between said two support points of each of said conductors, said insulating member having a plurality of space portions along a side thereof, said conductors being positioned in individual ones of said space portions;

the widths of said space portions being dimensioned for providing air gaps normally between the sides of said conductors and the sides of said space portions, the width of each gap (1) being large enough to prevent leakage of current between the positioned conductor and the adjacent insulating member so that the minimum distance A between the conductors can be selected solely in consideration of the insulating characteristics through air between the conductors, rather than by the insulating characteristics through the insulating member, and (2) being less than the maximum bending point beyond which the plastic deformation of the respective conductor occurs so that if a conductor is bent by an electromagnetic force created between the conductors, the conductors will return to their original positions when such an electromagnetic force is withdrawn; and

said predetermined points of support being selected so that the maximum bending point of each of said conductors is

less than the respective gap between each respective conductor and the adjacent insulating member.

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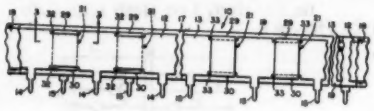
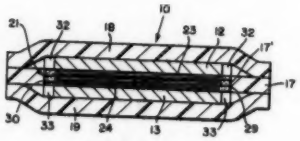
**4,517,406**

## LAMINATED BUS BAR CONTAINING MULTILAYER CERAMIC CAPACITORS

**Jack A. Erdle, Rochester, N.Y., assignor to Eldre Components, Inc., Rochester, N.Y.**

**Filed May 14, 1984, Ser. No. 610,097**
**Int. Cl.³ H01B** *7/00*
**U.S. Cl. 174—72 B** **11 Claims**





1. A laminated bus bar having therein a pair of elongate, metal conductor strips, and at least one multilayer capacitor sandwiched between said strips, and wherein the improvement comprises

a pair of spaced, parallel external electrodes on said capacitor having coplanar engagement with confronting surfaces on said strips, and

a pair of spaced metal termination plates on said capacitor extending transversely of said external electrodes and electrically connected each to a different one of said external electrodes,

each of said termination plates having opposed edges thereof confronting upon said metal strips, and

each of said metal strips having therein a pair of spaced recesses registering with the confronting edges of said termination plates.

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**4,517,407**

## HIGH VOLTAGE CABLE TERMINATOR AND METHOD OF ASSEMBLY

**James W. Fox, Orland Park, and Robert J. Hill, Lockport, both of Ill., assignors to G & W Electric Company, Blue Island, Ill.**

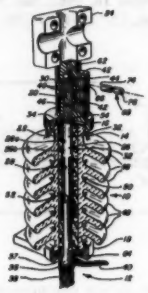
**Filed Sep. 21, 1982, Ser. No. 420,820**
**Int. Cl.³ H02G** *15/064;* **H01R** *43/00*
**U.S. Cl. 174—73 R** **8 Claims**

1. A termination assembly for a high voltage cable having an axial stranded conductor, a coaxial layer of insulation contacting the conductor, a coaxial layer of semiconductive material contacting the insulation, and a layer of grounded conductive wire wrapped around the semiconductive material, the assembly comprising:

a hood having a generally cylindrical cavity to receive an end portion of the high voltage cable and having means to attach a second conductor to its exterior,

a rigid housing positioned beneath said hood and attached thereto, said housing including a generally cylindrical interior bore which coaxially surrounds a portion of said high voltage cable beneath and adjacent to said end portion of said axial conductor,

an elastomeric tubular stress relief element of the type which is installed by releasing it from a highly stretched condition by removing a removable core from its interior coaxially gripping a portion of said cable within said housing in a stretched condition so that said element exerts force radially inward upon the cable, and



a sleeve of elastomeric material having an outer surface which engages the interior bore of said housing and having an inner surface which slidably engages said stress relief element and portions of said cable adjacent thereto.

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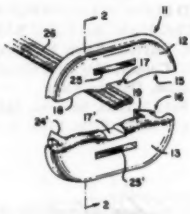
**4,517,408**

## SELF-CENTERING CABLE FASTENER

**Warren J. Pegram, Greensboro, N.C., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Jul. 27, 1983, Ser. No. 517,593**
**Int. Cl.³ H01B** *17/26;* **F16L** *5/00*
**U.S. Cl. 174—153 G** **10 Claims**



1. A cable fastener comprising first and second body parts having first and second faces, respectively, movable into abutment transversely of a cable to confine a cable between them, the first and second faces being formed with complementary, smoothly undulating, camming surfaces extending in orthogonal directions for substantially the entire areas of the faces precisely to center the body parts both axially and transversely of a cable during such movement.

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**4,517,409**

## METHOD FOR CHECKING FUNCTION STATES IN KEY TELEPHONE SYSTEM

**Yoshio Nagasaki, Yokohama, Japan, assignor to Kanda Tushin Kogyo, Japan**

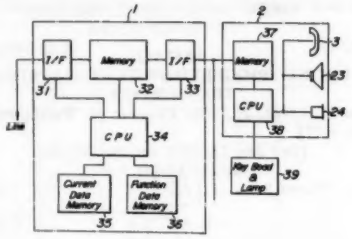
**Filed May 25, 1983, Ser. No. 498,048**
**Claims priority, application Japan, May 26, 1982, 57-89418**
**Int. Cl.³ H04M** *1/24*
**U.S. Cl. 179—81 C** **5 Claims**

1. A method for checking function states preset in a key

telephone system comprising a central control equipment and a plurality of key telephones each having indicators for indicating states of subscribers and/or extension lines in a normal use, comprising the steps of:

setting the central control equipment into a function check mode;

reading function data out of a function data memory provided in the central control equipment;




transmitting the function data thus read out to a key telephone;

driving the indicators of the relevant key telephone in accordance with the transmitted function data to produce indicator conditions which represent the transmitted function data; and

checking whether or not predetermined functions have been correctly preset by monitoring the conditions of the indicators.

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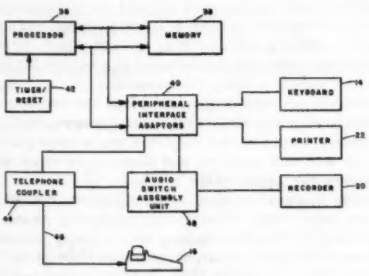
## 4,517,410
## AUTOMATIC USER SELECTED VARIABLE TELEPHONE MESSAGE RECORD AND PLAYBACK SYSTEM

**Daniel E. Williams; John J. Carley, and Paul S. Eaton, all of San Diego County, Calif., assignors to Data Acquisition Services, San Marcos, Calif.**

**Filed Apr. 2, 1982, Ser. No. 365,020**
**Int. Cl.³ H04M *1/64***
**U.S. Cl. 179—6.04** **30 Claims**




1. An automatic user selected variable telephone message playback system, comprising:

a recorder unit for recording information messages in a series of predetermined message areas on a recording medium each of said message areas being associated with a respective multiple digit message identifier corresponding to a particular series of telephone Touch-Tone signals, said recorder unit including drive means for driving said recording medium to the beginning of any one of said message areas and means for playing the information message in that message area;

a telephone coupler unit including means for connection to a telephone line and means for detecting incoming calls by a user on said telephone line;

an audio switching unit including means for selectively connecting said telephone line via said telephone coupler unit to said recorder unit in response to detection by said telephone coupler unit of a telephone call;

said selectively connecting means of said audio switching unit comprising a multi-directional switch assembly means operated by said automatic controller, said assembly means having four inputs and three outputs, the controller including means for controlling which of the inputs is connected to which of the outputs;

the four inputs comprising: a message recording line input; a data input connected from said automatic controller; a telephone line input connected from the telephone coupler unit; an input connected from an output of the recorder unit; and

the three outputs comprising: an output connected to an input to the recorder unit; a data output connected to the input of the automatic controller; and an output connected to the telephone coupler unit;

an automatic controller for controlling the operation of said units, said controller including:

means for monitoring said telephone line of said connected telephone call to detect a series of Touch-Tone signals on said telephone line entered from a user-operated Touch-Tone telephone and representing a message selected by said user;

means for associating said user-entered Touch-Tone signals with the corresponding message identifies;

means for automatically operating said recorder unit drive means in response to said detected Touch-Tone signals to drive said recording medium to the beginning of the message area associated with said corresponding message identifier, and for operating said recorder unit to play the information message store in said message area over said telephone line via said switching unit and coupler unit;

said controller selectably controlling said audio switching unit to connect said message recording line input through the output to the recording unit input in order to record a message on said recording medium;

said controller selectably controlling said audio switching unit to connect said data input form the automatic controller through the output to the recording unit input in order to write a beginning of message marker and an end of message marker onto said recording medium;

said controller selectably controlling said audio switching unit to connect said input from the recorder unit output through the output to the telephone coupler unit in order to enable a user to listen to a selected recorder message; and

said controller selectably controlling said audio switching unit to connect said telephone line input from the telephone coupler unit through the output to the recorder unit input in order to enable a user to record a message onto said recording medium.

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## 4,517,411
## METHOD AND APPARATUS FOR PRIVATE BRANCH EXCHANGE BILLING

**Kenneth H. Casner, 3004 Preston Ct., Rockwall, Tex. 75087, assignor to Kenneth H. Casner, Rockwall, Tex.**

**Filed Jun. 18, 1982, Ser. No. 389,855**
**Int. Cl.³ H04M *15/34***
**U.S. Cl. 179—7 R** **21 Claims**

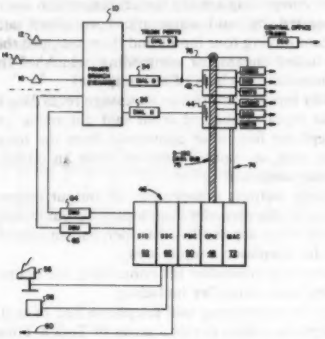
1. Apparatus for utilization with a private branch exchange having a plurality of telephone stations and central office trunks for verifying the particular call originating station of said plurality of telephone stations, said apparatus comprising:

first memory means for receiving and storing a telephone number entered by a station user at a selected one of a plurality of telephone stations;

first means responsive to the reception and storage of said

telephone number for requesting that said station user enter a particular station number corresponding to said selected one of said plurality of telephone stations;

verification means responsive to the entry of said particular station number for verifying the utilization of said selected one of said plurality of telephone stations; and



control means for accessing said first memory means in response to said verification and for transmitting said telephone number to one of said plurality of central office trunks.

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**4,517,412**

**CARD-ACTUATED TELECOMMUNICATION NETWORK**

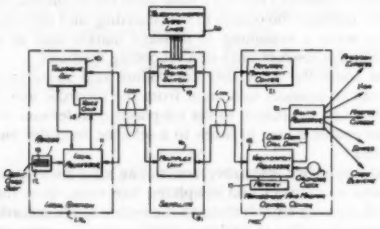
**Martha Newkirk, and Larry Newkirk, both of 8 Park La., Madison, N.J. 07940**

**Continuation-in-part of Ser. No. 356,430, Mar. 9, 1982, Pat. No. 4,439,636. This application Nov. 23, 1983, Ser. No. 554,726**

**The portion of the term of this patent subsequent to Mar. 27, 2001, has been disclaimed.**

**Int. Cl.[3] H04M** *1/02*

**U.S. Cl. 179—7.1 R** **7 Claims**



1. A public access network operating in conjunction with existing telecommunication lines, making it possible for a caller holding a credit card issued by any one of several companies to dial calls from any local station included in the network, said network comprising:

A. a satellite acting as a hub to connect local stations associated therewith to said telecommunication lines;

B. a plurality of local stations accessible to the public and associated with said satellite, each station being provided with a normally-inactive communication set linked to said satellite whereby when said set is activated, a call dialed therefrom goes through a line selected from said telecommunication lines to the called destination, and a credit card reader adapted to receive a caller's credit card to generate a digital signal representing the card and its holder;

C. means responsive to said signal to determine its acceptability to the network, thereby limiting access to the network to valid cards; and

D. means to generate data regarding the location of the local station from which each call originates as well as the destination of the call and its duration and to relate this data to data derived from the digital signal in regard to the identity of the credit card used by each caller to provide billing information to be supplied to the several companies, making it possible for each of these companies to bill its card holders for calls made through the network.

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**4,517,413**

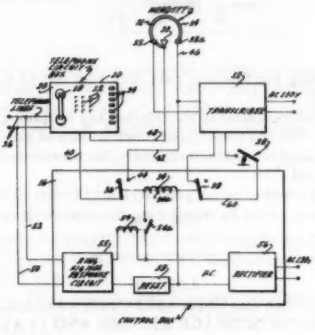
**TELEPHONE TRIGGERED SWITCHING SYSTEM FOR TRANSCRIBER**

**William H. Pavitt, Jr., 1334 Charmel Pl., Pacific Palisades, Calif. 90272**

**Filed Jan. 23, 1984, Ser. No. 573,015**

**Int. Cl.[3] H04M** *1/65*

**U.S. Cl. 179—81 R** **4 Claims**



1. A transcriber/telephone work station system, said system including:

(a) a telephone station box having an incoming line, circuitry connected thereto, and a telephone connected to said circuitry;

(b) a transcriber, said transcriber including on-off switching means, electronic means to convert electromagnetically recorded dictation to audio frequency output, and socket means to receive a headset plug through which the audio frequency output may be delivered to a headset for listening by a person utilizing the transcriber;

(c) a headset, said headset having at least one earphone and means to plug into said socket means to convey said audio frequency output to said earphone, and a microphone in circuit with said earphone and disposed for voice reception from the wearer of the headset;

(d) telephone signal actuated switching means, the last said means comprising: double acting switching means, the first switch of said switching means being connected between the telephone circuitry and the microphone/earphone circuit of said headset, and the second switch of said double acting switching means being interposed in the line of said on-off switching means, said double acting switching means, in its first and normal position, having its said first switch open and its second switch closed, and in its second position, its first switch closed and its second switch open; and means connected to said incoming telephone line and responsive to the ring signal arriving therethrough, to shift said double acting switching means from its first position to its second position and releaseably held in its second position, whereby said transcriber becomes turned off, and the telephone circuitry is connected to the microphone/earphone circuit of said headset to enable the person at the transcriber/telephone work station to receive the call arriving through said circuitry and indicated

by said ring signal, and to converse with the caller; and means to reset said double acting switching means to its first position.

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**4,517,414**

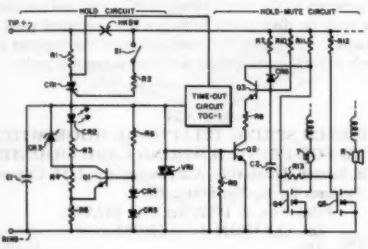
## HOOKSWITCH BOUNCE RESISTANT TELEPHONE HOLD-MUTE CIRCUIT

**Eduard F. B. Boeckmann, Huntsville, Ala., assignor to GTE Communication Systems Corp., Northlake, Ill.**

**Filed Dec. 12, 1983, Ser. No. 560,623**

**Int. Cl.³ H04M *1/00***

**U.S. Cl. 179—81 R** **13 Claims**




1. A subscriber's telephone circuit connected to a pair of telephone line conductors and including a transmitter, a receiver, a hookswitch and a hold circuit comprising: a manually operated switch; a holding bridge including a plurality of resistances connected in series, connectable between said line conductors; gating means included in said holding bridge and including a circuit connection to said switch operated in response to the manual operation of said switch to complete a circuit path through said holding bridge between said line conductors; and there is further included shunt means connected in parallel with at least one of said resistances operated in response to a flow of less than a predetermined amount of current through said holding bridge, to provide a low impedence path around said parallel connected resistor.

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**4,517,415**

## HEARING AIDS

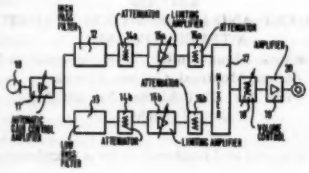
**Roger F. Laurence, Camberley, England, assignor to Reynolds & Laurence Industries Limited, Channel Islands**

**Filed Oct. 20, 1982, Ser. No. 435,870**

**Claims priority, application United Kingdom, Oct. 20, 1981, 8131600**

**Int. Cl.³ H04R *27/02***

**U.S. Cl. 179—107 FD** **10 Claims**



1. A hearing aid, comprising; a first electro-acoustic transducer for converting sound to an electrical signal; frequency dependent filtering means comprising a high pass filter and a low pass filter for dividing the electrical signal from said first transducer into two signals of different frequency bands; a high pass channel and a low pass channel comprising respective variable gain circuits arranged to reduce the dynamic range of the signals from said high pass filter and said low pass filter, respectively said filters having substantially the same turnover frequency, in the range 1000 to 2000 Hz; means for mixing the outputs of the channels; and a second electroacoustic transducer for converting the output of said mixing means to an acoustic signal; each of said variable gain circuits being arranged to provide constant gain amplification for the signals from said respective filter below a predetermined threshold and, for signals above said predetermined threshold, to provide a peak output which is substantially constant without distorting said signals.

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**4,517,416**

## ELECTRO-ACOUSTIC TRANSDUCER HAVING A DIAPHRAGM COMPRISING A LAYER OF POLYMETHACRYLIMIDE FOAM

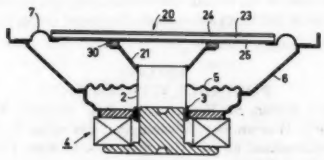
**Urbanus P. M. Goossens, Dendermonde, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 17, 1983, Ser. No. 467,539**

**Claims priority, application Netherlands, Feb. 22, 1982, 8200690**

**Int. Cl.³ H04K *1/24, 1/28, 7/00***

**U.S. Cl. 179—115.5 PS** **23 Claims**




1. A diaphragm for an electro-acoustic transducer which comprises a layer of a polymethacrylimide foam having a modulus of elasticity between $15\times10^6$ and $120\times10^6 N/m^2$ and a density between 10 and 80 $kg/m^3$.

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**4,517,417**

## COMMUNICATION SYSTEM FOR A MOTOR VEHICLE

**Masato Murayama, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 23, 1983, Ser. No. 477,926**

**Claims priority, application Japan, Mar. 25, 1982, 57-042176[U]; Mar. 25, 1982, 57-042177[U]; Mar. 25, 1982, 57-042178[U]; Mar. 25, 1982, 57-042179[U]; May 12, 1982, 57-069336[U]**

**Int. Cl.³ H04R *1/08, 1/28***

**U.S. Cl. 179—156 R** **2 Claims**

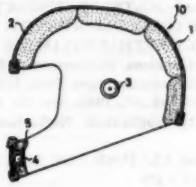
1. A protective headwear having a microphone and a speaker mounted therein, wherein the protective headwear is of a full-face type comprising:

a speaker operatively positioned so that a sound producing part thereof is located behind the ear of a user of the protective headwear;

a microphone having a first sound collecting surface and a second portion positioned to be buried in a front lower part of the protective headwear, offset from a central plane of the protective headwear, and arranged so that said first sound collecting surface of microphone is perpendicular to a surface of an inner wall of said front lower part and positioned to be closer to the central plane than said second portion of the microphone;

said microphone including a housing member with a sound

introducing passage leading from said sound collecting surface and opening in said inner wall, and an area of an



aperture of the sound introducing passage increases as the distance increases away from the sound collecting surface.

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**4,517,418**

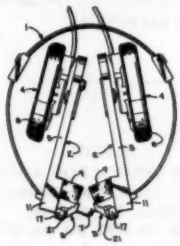
## PORTABLE STEREOPHONE

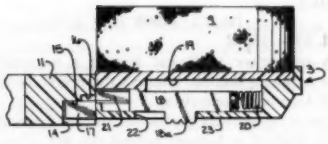
**Michael S. Baran, St. Francis; Joseph C. Bessasie, Milwaukee; Wayne L. Warren, Port Washington, and Allen W. Montgomery, Milwaukee, all of Wis., assignors to Koss Corporation, Milwaukee, Wis.**

**Filed Nov. 7, 1983, Ser. No. 549,667**

**Int. Cl.³ H04M *1/05;* H04R *1/10***

**U.S. Cl. 179—156 R** **2 Claims**





1. In a stereophone having a headband with cup assemblies connected to each end of the headband, and wherein each cup assembly comprises:

(a) a temporal pad which connects to the headband and which engages the user's head above the ear when the stereophones are in use;

(b) a support arm pivotally connected to the temporal pad and extending downward therefrom when the stereophones are in use;

(c) an ear cup connected to the support arm and containing an acoustic transducer which is positioned over the user's ear when the stereophones are in use;

(d) a slider mounted in the temporal pad and having a wedge which extends out the end of the temporal pad to engage the support arm when the slider is in one position and which is retracted into the temporal pad when the slider is in a second position;

(e) a plurality of bearing surfaces formed on the support arm adjacent is pivotal connection with the temporal pad, each bearing surface being positioned to engage the slider wedge and lock the support arm in a different orientation; and

wherein the headband provides a clamping force which retains the stereophones to the user's head when in use, and the clamping force may be distributed between the temporal pads and the ear cups by adjusting the orientation of the support arms about their pivotal connections with the temporal pads.

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**4,517,419**

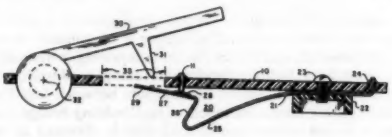
## CANTILEVER SPRING TELEPHONE HOOKSWITCH ADAPTED FOR PRINTED WIRING CARD MOUNTING

**Richard B. Kosten, Huntsville, Ala., assignor to GTE Communication Systems Corp., Northlake, Ill.**

**Filed Nov. 1, 1982, Ser. No. 437,973**

**Int. Cl.³ H01H *1/18;* H04M *1/08***

**U.S. Cl. 179—159** **10 Claims**



1. For use in a telephone instrument, a hookswitch assembly comprising: a planar base including an electrical contact mounted thereon; a first resilient cantilever arm including a support end fastened to said base and a flexible section including a cross section reduced in area relative to the cross section of the rest of said first cantilever arm; a second resilient cantilever arm including a free end and a contact engaging surface positioned against said electrical contact; connecting means joining said first cantilever arm to said second cantilever arm; and an actuator assembly initially operated in a first direction to depress said second arm, wiping said contact engaging surface across said contact and further operated in said first direction to depress said first arm, disengaging said contact engaging surface from said contact.

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**4,517,420**

## INTEGRAL CUP AND HOOKSWITCH ACTUATOR FOR A TELEPHONE SET

**Steve W. Haskins, Mount Juliet, Tenn., assignor to Northern Telecom Limited, Montreal, Quebec, Canada**

**Filed Apr. 20, 1983, Ser. No. 486,722**

**Int. Cl.³ H04M *1/08***

**U.S. Cl. 179—164** **12 Claims**

1. An integral cup and hookswitch for a telephone set, comprising;

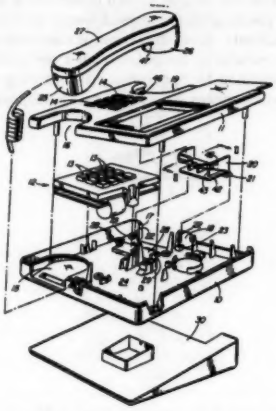
a cup for receiving one end of a handset, said cup including a bottom surface and a lever extending below said bottom surface and having an inner end;

means pivotally mounting said cup at an outer edge on a telephone set base, for pivotal movement about an axis parallel to said outer edge, said lever extending inward from said axis;

a switch positioned in said telephone set base, said switch including contact actuating members extending beneath said inner end of said lever;

means resiliently biasing said cup about said axis to move

said lever inner end upward to actuate said switch to an off hook condition;



replacement of a handset pivoting said cup against said resilient biasing means to move said lever inner end downward and actuate said switch to an on hook condition.

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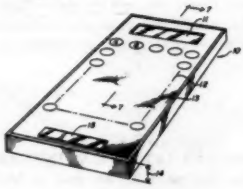
**4,517,421**

## RESILIENT DEFORMABLE KEYBOARD

George D. Margolin, 1815 Sherington Pl., Apt. V-203, Newport Beach, Calif. 92663

Continuation of Ser. No. 116,291, Jan. 28, 1980, abandoned. This application Feb. 18, 1983, Ser. No. 468,035
Int. Cl.³ H01H 9/00, 13/70
U.S. Cl. 200—1 R 16 Claims



1. An improved keyboard of the type having an array of keyfaces and a corresponding array of switches, wherein the improvement comprises:

a sheet having a first side and an opposing second side with a plurality of apertures extending from the first to the second side, such apertures each extending, from and in registry with a keyface on the first side, to the corresponding switch at the second side;

a plurality of closed cells, each cell being disposed in one of the apertures and having first and second elastically deformable surfaces defining first and second ends thereof proximate to the first and second sides of the sheet, respectively;

each such cell being filled with a deformable medium at least somewhat resistant to compression for tranducing deformations of the first surface caused by pressure on the keyface, into deformations of the second surface for operating the corresponding switch;

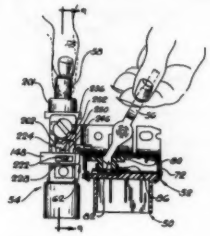
each aperture being of a dimension to laterally confine the sidewalls of the cell disposed therein so that motion of the first surface is transduced into motion substantially only of the second surface without motion of the cell sidewalls.

**4,517,422**

## ELECTRICAL SWITCH HAVING INTERLOCKED BLOWER AND AIR CONDITIONER SWITCH COMPONENTS FOR VEHICLES

Charles E. Black, III, Mt. Prospect, and Raymond T. Halstead, Wheeling, both of Ill., assignors to Indak Manufacturing Corp., Northbrook, Ill.

Filed Apr. 10, 1984, Ser. No. 598,840
Int. Cl.³ H01H 9/26
U.S. Cl. 200—50 C 6 Claims



1. A combination blower and air conditioner switch device for vehicles, comprising

a blower switch having first casing means,

an air conditioner switch having second casing means secured alongside said first casing means,

a blower control member movable in said first casing means along a path between an OFF position remote from said second casing means and at least one ON position along said path closer to said second casing means,

blower contact means operable by said blower control member to an open position when said blower control member is in said OFF position while being operable to a closed position with said blower control member in said ON position,

means for moving said blower control member along said path,

an air conditioner control member movable in said second casing means between circuit opening and closing positions,

a return spring for biasing said air conditioner control member toward said circuit opening position,

air conditioner contact means operable by said air conditioner control member to an open position with said air conditioner control member in said circuit opening position while being operable to a closed position with said air conditioner control member in said circuit closing position,

latching means for latching said air conditioner control member in said circuit closing position,

said latching means including a latching element,

and interlock means movable between enabling and disabling positions and including a disabling member for engaging said latching element to disable said latching means with said interlock means in said disabling position,

said interlock means including operating means connected to said disabling member for moving said disabling member to said disabling position when said blower control member is moved away from the direction of said second casing means to said OFF position while moving said disabling member to said enabling position when said blower control member is moved from said OFF position toward said second casing means,

said latching means thereby being disabled from latching said air conditioner control member in said circuit closing position when said blower control member is in its OFF position,

said latching means being enabled to latch said air conditioner control member in said circuit closing position

when said blower control member is moved away from said OFF position to said ON position.

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**4,517,423**

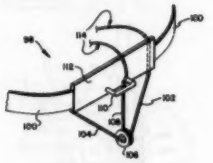
**HUMAN BODY ACTIVATED SWITCH**

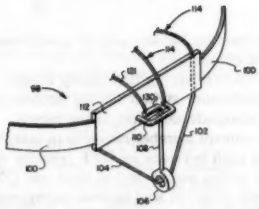
**William N. Smith, III, P.O. Box 1061, Carrollton, Tex. 75006**

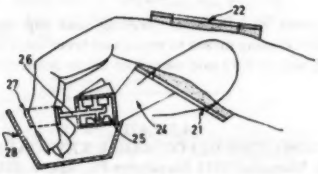
**Filed Jun. 4, 1982, Ser. No. 385,016**

**Int. Cl.³ H01H** *35/00*

**U.S. Cl. 200—52 R** **6 Claims**







1. An electrical switch for use by a person and including first and second wires for switchable connection, said switch comprising:

a nonconducting support frame mounted upon the persons body;

a first electrical contact mounted upon and extending from said frame and connected to said first wire; and

contacting means for providing contact between said first contact and a electrically conducting leverarm, said contacting means including a friction device positioned against a portion of the person's skin movable by the person in relation to the support frame and supported by a electrically conducting support arm pivotally mounted upon the support frame and connected thereto to said second wire, said leverarm having a first end mounted in said friction device in electrical contact with the support arm and having a second end positioned adjacent to said first contact wherein movement of the portion of the person's skin by the person will cause contact between the first contact and leverarm resulting in an electrical connection between the first and second wires.

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**4,517,424**

**HAND-SECURED PUSHBUTTON CONTROL DEVICE**

**Patrice Kroczynski, Vitry, France, assignor to Inro France, Nanterre, France**

**Continuation of Ser. No. 395,086, filed as PCT FR 81/00130, Oct. 15, 1981, published as WO 82/01345 on Apr. 29, 1982, § 102(e) date Jun. 15, 1982, abandoned.**

**This application Jun. 12, 1984, Ser. No. 619,408**

**Claims priority, application France, Oct. 17, 1980, 80 22205; Jun. 9, 1981, 81 11278; Oct. 15, 1981, PCT/FR81/00130**

**Int. Cl.³ H01H** *35/00;* **B41J** *5/00;* **G08C** *9/00*

**U.S. Cl. 200—52 R** **5 Claims**

1. A control device comprising a body which can be maintained in a substantially fixed position relative to the palm and back of the user's hand without immobilizing the user's fingers; and a plurality of sets of switch means supported by said body, each of said sets of switch means being aligned with and adapted to be operated by a different finger, each of said pushbutton sets comprising first, second, third, and fourth switch means, said first and second switch means being adapted to be actuated by pivoting of the aligned finger in first and second senses, respectively, about the center of said hand, in directions substantially parallel to the palm, from a rest position to positions corresponding to the opening and closing of the hand; said third switch means in each set being adapted to be operated by the aligned finger through the movement of the finger in a direction substantially perpendicular to the palm from the rest position to a position relatively remote from the palm; and said fourth switch means in each set being adapted to be operated by the aligned finger through the movement of the finger in a direction substantially perpendicular to the palm, from the rest position to a position relatively proximate to the palm.

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**4,517,425**

**SELF-FLOW GENERATING GAS INTERRUPTER**

**Donald R. Martin, Racine, Wis., assignor to McGraw-Edison Company, Rolling Meadows, Ill.**

**Filed Sep. 14, 1983, Ser. No. 532,012**

**Int. Cl.³ H01H** *33/70*

**U.S. Cl. 200—148 A** **14 Claims**

1. A circuit interrupter comprising:

(a) a stationary casing adapted to be filled with an arc extinguishing gas;

(b) a first electrical contact carried by said stationery casing;

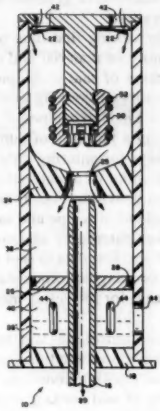
(c) a second electrical contact which is movably disposed within and carried by said stationery casing so as to engage and disengage said first contact;

(d) negative pressure means, comprising a suction chamber formed by a cylinder and a piston, for producing a negative pressure region within said cylinder in response to disengaging movement of said first and second contacts, one of said piston and cylinder being carried by said second electrical contact;

(e) a gas storage chamber formed by said stationary casing and said first and second contacts when said first and second contacts are engaged;

(f) a suction guide for connecting said storage chamber to said negative pressure region within said negative pressure means; and

(g) first valve means, in flow communication with said gas storage chamber, for supplying gas from said casing to



said chamber in response to pressure within said chamber decreasing below a pre-selected first pressure value.

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**4,517,426**

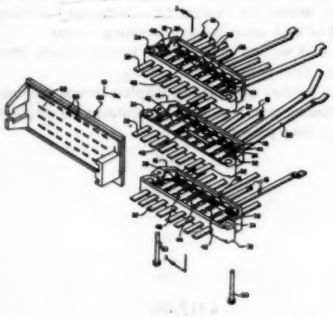
## ELECTRICAL BUSSING FOR A SWITCH ARM CONNECTOR BLOCK

**James D. Edwards, Brentwood, and Charles Malone, Franklin, both of Tenn., assignors to The Scott & Fetzer Company, Fairview, Tenn.**

**Filed Feb. 29, 1984, Ser. No. 584,782**

**Int. Cl.³ H01H** *43/10, 1/26*

**U.S. Cl. 200—38 A** **20 Claims**



1. A switch arm connector block for mounting a plurality of spring switchblades in a predetermined array for sequential cooperation with a timer cam and for providing a quick disconnect connector for electrically connecting the blades to a wiring harness comprising insulating block means, a plurality of flat, parallel switchblades passing through and having body portions encapsulated by said block means, said switchblades defining a first series of parallel planes and having longitudinal axes defining a second series of parallel planes transverse to said first series, said blades extending transversely as cantilevers from an end face of said insulating block means, tunnel means in said block for providing passageways along said first series of planes between and among the encapsulated switchblade body portion defining each of said first series of parallel planes, bussing means within said passageways electrically connecting at least two switchblades in at least one of said first series of parallel planes, means defining channels at said end face of said block means, and bussing means in said channels providing an electrical connection between a switchblade in one of said first series of parallel planes and a switchblade in another one of said first series of parallel planes.

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**4,517,427**

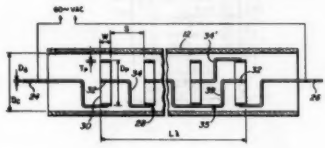
## FREQUENCY RESONANCE HEATER

**Charles H. Coy, Springport, Ind., assignor to Richard H. Williams, Muncie; Marion L. DeBolt and Daniel C. Burry, both of Decatur, all of, Ind.**

**Filed Jun. 17, 1983, Ser. No. 505,482**

**Int. Cl.³ H05B** *5/00*

**U.S. Cl. 219—10.51** **20 Claims**



1. In combination with a source of electrical energy having a relatively low pulsating frequency, an electrical heater, comprising an elongated container, a body of liquid confined to the container, electrode means mounted in the container for establishing an electrical current path within the body of liquid from which heat is evolved, and power terminal means connecting the source to the electrode means at fixedly spaced feeder end points between which the path extends for establising resonance conditions under which electromagnetic waves are propagated within a frequency band having a relatively high fundamental frequency that is a harmonic of the relaively low frequency of the source to generate said heat within the body of liquid.

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**4,517,428**

## MENU DISPLAY DEVICE

**Kazufumi Matsushima, Fuji, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed May 24, 1982, Ser. No. 381,512**

**Claims priority, application Japan, May 29, 1981, 56-78870[U]; Jun. 19 1981, 56-90257[U]**

**Int. Cl.³ H05B** *6/06*

**U.S. Cl. 219—10.55 B** **8 Claims**

1. A menu display device adapted for a cooking apparatus, comprising:

a cylindrical body supported for rotational movement about a center axis;

a plurality of menu cards turnably attached at one end thereof to an outer peripheral surface of said cylindrical body;

a housing in which said cylindrical body and said cards are housed;

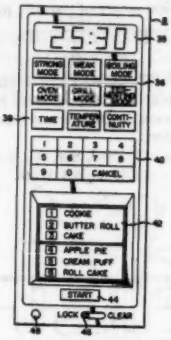
means for rotating said cylindrical body;

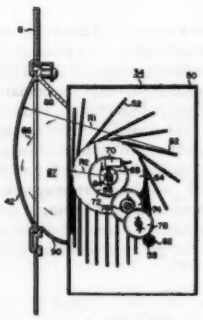
a curved transparent cover having concave and convex surfaces and a radius of curvature greater than a radius of said cylindrical body, said concave surface of the cover facing said cylindrical body to define a space therebetween through which sald menu cards pass while being turned upon rotation of the cylindrical body, said convex surface of the cover being fixed to said housing such that said convex surface projects from a surface of said housing; and

a stopper having an end against which the other end of the menu card abuts and adapted to hold the abutting menu card erect when said cylindrical body is stopped; and wherein

said transparent cover has a center of curvature which is

upwrdly displaced relative said center axis of said cylindrical body to permit said menu cards to be exposed to an



increased amount of external light which passes through said transparent cover.

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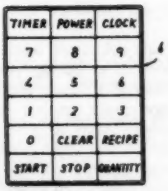
**4,517,429**

## ELECTRONIC CONTROLLED HEAT COOKING APPARATUS AND METHOD OF CONTROLLING THEREOF

**Atsushi Horinouchi, Otsu, Japan, assignor to Sanyo Electric Co., Ltd., Japan**

**Continuation of Ser. No. 76,754, Sep. 18, 1979, abandoned. This application Jan. 13, 1982, Ser. No. 339,057**
**Claims priority, application Japan, Dec. 14, 1978, 53-158962**
**Int. Cl.³ H05B 6/68**
**U.S. Cl. 219—10.55 B** **1 Claim**




1. A microwave oven, comprising:

means defining a chamber for receiving a quantity of a material to be cooked,

microwave generating means for supplying microwave energy to said chamber for heating the material to be cooked, said microwave oven having a non-linear relation between the quantity of a material being cooked and the rate at which microwave energy is supplied to said material from said microwave generating means in performing a cooking operation,

storage means for storing first data non-linearly associated with said quantity of material and compensating for said non-linear relation of said oven and storing second data defining a plurality of cooking conditions corresponding to a plurality of kinds of recipes,

entry means having a plurality of numeral keys and at least two function keys for entering data concerning a kind of recipe and a quantity of a material to be cooked,

cooking condition providing means responsive to said data concerning the kind of recipe and said quantity of a material being cooked entered by said entry means for accessing said second and first data in said storage means and for modifying the cooking condition data by the first data in said storage means for providing modified cooking condition data, and

control means for controlling said microwave generating means responsive to said modified cooking condition data provided by said cooking condition providing means,

wherein a plurality of said cooking conditions stored in said storage means corresponds to a unit quantity of a material to be cooked, and at least one function key is used for entering said quantity data as a multiple with respect to said unit quantity,

wherein said storage means includes means for storing said first data in terms of a plurality of expansion coefficients corresponding to a plurality of different quantities of a material to be cooked, and

wherein one or more of said cooking conditions stored in said storage means corresponds to a unit quantity of a material to be cooked, and said storage means stores each of said expansion coefficients with respect to each of a plurality of multiples of said unit quantity,

further comprising:

remaining time period evaluating means responsive to said control means for evaluating a remaining cooking time period of said microwave generating means,

wherein said second data of said storage means includes a cooking time period,

said oven further comprising display means responsive to said cooking condition providing means for displaying the cooking time period.

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**4,517,430**

## MICROWAVE HEATING DEVICE WITH CONSTANT TEMPERATURE CONTROL OF THE MAGNETRON

**Mark J. Slottag, Chicago, Ill., assignor to GCA Corporation, Bedford, Mass.**

**Filed May 10, 1983, Ser. No. 493,368**
**Int. Cl.³ H05B 6/68**
**U.S. Cl. 219—10.55 B** **18 Claims**

1. A heating device for use in laboratories and the like comprising:

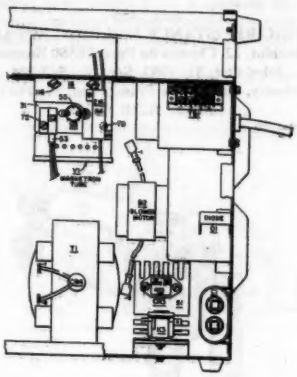
an oven-type housing;

apparatus for generating microwaves for drying sample materials within said oven-type housing;

means for energizing the microwave generating apparatus for drying for a given portion of a cycle of input power depending upon a desired heat output setting for achieving substantially uniform heating; and

apparatus in heat conducting contact with said microwave

generating apparatus for holding the microwave generating apparatus at practically a constant temperature for the



purpose of providing an extremely steady output therefrom.

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**4,517,431**

## SAFETY DEVICE FOR A HEATING APPLIANCE

**Shigeki Ueda, Yamatokoriyama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

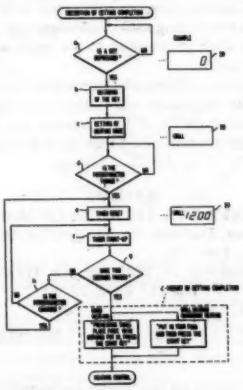
**PCT No. PCT/JP82/00162, § 371 Date Jan. 5, 1983, § 102(e) Date Jan. 5, 1983, PCT Pub. No. WO82/04114, PCT Pub. Date Nov. 25, 1982**

**PCT Filed May 11, 1982, Ser. No. 459,543**

**Claims priority, application Japan, May 11, 1982, 56-71714; May 13, 1981, 56-71715; May 4, 1981, 56-86421**

**Int. Cl.³ H05B *6/64***

**U.S. Cl. 219—10.55 B** **5 Claims**



1. A heating appliance comprising: a heating chamber for receiving an object to be heated therein; a heating means connected to said heating chamber; a main control section for controlling electric power which is supplied to said heating means; a memory connected to said control section for storing data on heating; an input means connected to said memory for inputting said data to said memory; a timer means and a reporting means connected to said control section; wherein when data on heating is inputted or corrected by said input means, said timer is started, and if no data is inputted during the elapsing of a predetermined time period as determined by said timer, then said main control section determines that the setting or correcting of data on heating has been completed, and causes said reporting means to report that it is possible to start heating, wherein a voice synthesizing means comprises said reporting means.

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**4,517,432**

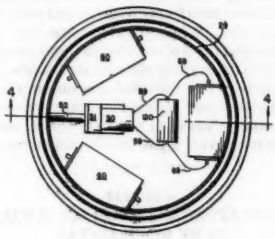
## CAVITY ANTENNA MICROWAVE POWERED TURNTABLE

**Thomas K. Ishii, Brown Deer, Wis., and Jorgen A. Jorgensen, Bloomington, Minn., assignors to Northland Aluminum Products, Inc., Minneapolis, Mich.**

**Filed Dec. 13, 1982, Ser. No. 449,394**

**Int. Cl.³ H05B *6/78***

**U.S. Cl. 219—10.55 F** **29 Claims**



1. A portable turntable for use in microwave ovens comprising:

(a) a base formed from a microwave transmissive material,

(b) a turntable platform formed from a microwave transmissive material and situated above the base,

(c) a housing fixedly mounted to the base,

(d) a motor enclosed within the housing,

(e) transmission means driven by the motor and connected to the platform for moving the platform relative to the base,

(f) at least one cavity antenna for receiving microwave engergy defined by a plurality of electrically conductive walls and exposed to microwave energy via an opening through a side wall of the housing,

(g) a rectifier situated at the focal point of a resultant electric field produced within the cavity antenna for coverting microwave energy to electrical energy usable by the motor, and

(h) leads connecting the rectifier to the motor.

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**4,517,433**

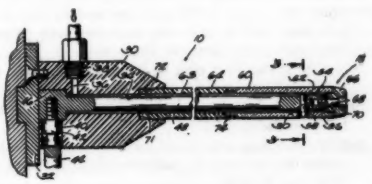
## GAS WELDING ELECTRODE FOR A SMALL BORE

**Andrew Chmela, New Berlin, Wis., assignor to Ameco Corporation, Menomonee Falls, Wis.**

**Continuation of Ser. No. 355,430, Mar. 8, 1982, abandoned. This application May 7, 1984, Ser. No. 608,270**

**Int. Cl.³ B23K *9/28***

**U.S. Cl. 219—75** **3 Claims**



1. An integrated electric arc torch assembly of a conductor rod having a shoulder which forms an abutment at one end, a

mounting block, an electrical insulating sleeve, a refractory sleeve having an electrode aperture and means for securing said components in said assembly, said mounting block receiving and supporting said rod and said insulated sleeve extending from said mounting block and providing a gas passage between said conductor rod and said sleeve, said insulating sleeve being seated against an abutment on said mounting block, an electrode projecting from said conductor through said electrode aperture, means for adjustably securing said electrode to said conductor, a refractory sleeve surrounding the lower end of said conductor and said electrode and having wall means defining a gas outlet located in the side wall of said sleeve and said electrode projecting through said gas outlet and spaced from said gas outlet wall means to provide an annular gas passage therebetween, said means for securing said components in assembly including connector means for connecting said refractory sleeve to said conductor rod to connect said insulative sleeve and refractory sleeve in integrated assembly with said mounting block, said refractory sleeve and said insulative sleeve having interfitting joinable end parts, said connector means including an insulative end cap, and screw means extending through said cap, said cap having a shoulder engageable with said refractory sleeve and said screw means being threadably received in a threaded aperture in the end of said conductor to clamp said joinable end parts of said refractory sleeve and insulative sleeve in assembly against said conductor abutment and to provide a gas seal at said end parts.

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**4,517,434**

## METHOD AND APPARATUS FOR MANUFACTURING A TUBE BEND METAL

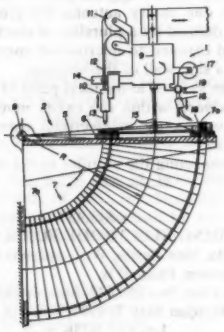
**Karl Million, and Horst Zimmermann, both of Oberhausen, Fed. Rep. of Germany, assignors to M.A.N. Maschinenfabrik Augsburg-Nürnberg Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Dec. 5, 1983, Ser. No. 557,928**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1982, 3245401**

**Int. Cl.³ B23K** *31/06, 9/04*

**U.S. Cl. 219—76.12** **9 Claims**



1. A method of manufacturing a tube bend having a radius of curvature and using welding equipment having at least one welding head and a base ring movable with respect to the welding head, comprising the steps of:

positioning the base ring in a horizontal plane below the welding head;

depositing a first ring section of metal using the welding head on the ring;

rotating the base ring about a horizontal axis and along the radius of curvature by substantially a thickness of the first ring ring section;

depositing a subsequent ring section using the welding head over the first ring section; and

repeating the moving and the depositing steps until the desired number of ring sections are formed for the tube bend.

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**4,517,435**

## ELECTRIC RESISTANCE WELDING APPARATUS

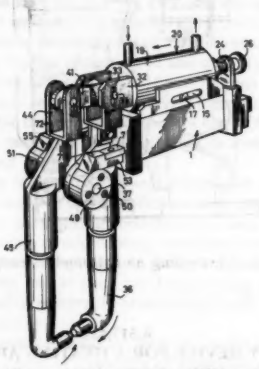
**Bernard Humblot, 22, Chemin du Parc, 78580 Bazemont, France**

**Filed Oct. 31, 1983, Ser. No. 547,224**

**Claims priority, application France, Jul. 11, 1983, 83 11510**

**Int. Cl.³ B23K** *11/10*

**U.S. Cl. 219—89** **8 Claims**



1. Electrical resistance welding apparatus comprising;

(a) a frame on which is mounted a transformer having a primary winding adapted to be connected to a source of alternating current;

(b) a U-shaped, single turn secondary magnetically coupled to the primary winding and having a pair of spaced arms;

(c) a pair of electrodes pivotally mounted on a common shaft carried by said frame, each electrode having a contact with a circular surface that is concentric with the axis of the shaft;

(d) a fluid operated jack;

(e) coupling means interconnecting said jack to said pair of electrodes for causing said electrodes to pivot like scissors about said shaft in response to the application of fluid to said jack; and

(f) contact shoes electrically connected to the respective arms of said secondary and in electrical engagement with the circular surfaces of the contacts on said electrodes during their pivotal movement on said shaft.

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**4,517,436**

## LASER MARKER FOR ARTICLES OF MANUFACTURE

**Merlin Lawrence, Fairview, Pa., assignor to Automated Industrial Systems, Erie, Pa.**

**Filed Sep. 20, 1982, Ser. No. 419,807**

**Int. Cl.³ B23K** *27/00*

**U.S. Cl. 219—121 LH** **15 Claims**

1. A machine for marking indicia on articles of manufacture comprising:

a frame,

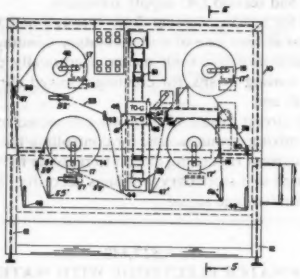
first support means on said frame for supporting a feed reel having a strip assembly of sheet material supporting said articles thereon,

second support means on said frame for supporting a take-up reel for rewinding said strip assembly thereon from said feed reel,

said strip assembly comprising said articles, a support strip, and means holding said articles to said articles to said support strip,

a cover strip and a means removably holding said cover strip to said articles,

said strip assembly being adapted to be wound on said take up reel, and unwound from said feed reel,
said cover strip separated from said articles,
said support strip passed under a marking means and said cover strip replaced on said support strip with said articles therebetween and said assembly reeled onto said take-up reel,
an individual motor connected to each said feed reel and to



each said take-up reel, and means to control said motor for driving said motors at variable speeds,
means to support said strip between said reels,
said means to control said motors comprising linear transducer means on said frame and connected to said strip support means, and adapted to control the speed of each of said motors in response to the tension on said strip,
marking means on said frame between said reels for marking each said article.

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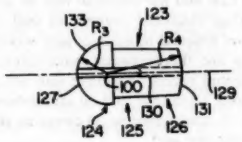
**4,517,437**

## GAS SHIELDED PLASMA ARC TORCH AND COLLET ASSEMBLY

**Yosef Yerushalmy, and Larry W. Stokes, both of Florence, S.C., assignors to Union Carbide Corporation, Danbury, Conn.**

**Continuation of Ser. No. 219,876, Dec. 24, 1980, abandoned.**
**This application Jan. 24, 1983, Ser. No. 460,552**
**Int. Cl.³ B23K** *9/00*
**U.S. Cl. 219—121 PP** **9 Claims**




1. A gas shielded plasma arc torch comprising:
a torch body having a longitudinal axis with a front end and a rear end having a bore for receiving an electrode;
a collet support member in said torch body having a seat;
a collet in said collet support member having a front section, an elongated center section and a rear section for receiving and gripping said electrode;
at least a portion of the surface of said collet front section being defined by a first selected sphere engaging said collet support member seat for rotation in said seat about the center of said first selected sphere;
a knob member screwed into the rear of said collet support member having seating means mounted on a forward facing surface;
at least a portion of the surface of said collet rear section being defined by a second selected sphere having a center essentially coincident with the center of said first selected sphere wherein the centers of the first and second spheres lie at essentially the same location along the longitudinal axis of the torch and with the radius of the first sphere being different than the radius of the second sphere; and
said knob member being tightenable for locking the position of said collet and causing said collet to grip said received electrode thereby locking and fixing the position of said received electrode and reversibly operable for releasing said collet and said received electrode.

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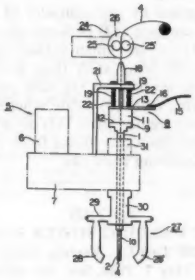
**4,517,438**

## ROTARY ARC-WELDING APPARATUS

**Yuji Sugitani, and Yukio Kobayashi, both of Tsu, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 26, 1983, Ser. No. 535,887**
**Int. Cl.³ B23K** *9/28*
**U.S. Cl. 219—125.12** **1 Claim**



1. A rotary arc-welding apparatus which comprises:
a nozzle rotatable about the center axis thereof at a high speed, said nozzle having in the interior thereof a passage for directing a consumable welding electrode eccentrically from the center axis of said nozzle toward a groove formed between objects of welding;
a consumable welding electrode feeding mechanism, provided above said nozzle, for continuously directing said consumable welding electrode toward said groove through said nozzle;
a welding current feeding mechanism for feeding a welding current to said nozzle to produce an arc between said groove and the tip of said consumable welding electrode passing through said nozzle;
a nozzle rotating mechanism for rotating said nozzle about the center axis thereof at a high speed to cause a circular movement of said arc from the tip of said consumable welding electrode corresponding to the eccentricity thereof, said nozzle rotating mechanism comprising a motor fixed to a carriage, gears for transmitting the rotation of said motor to said nozzle, and a gear box for housing said gears, said gear box rotatably supporting said nozzle passing therethrough; and
a shielding gas feeding mechanism for feeding a shielding gas toward said arc and a weld zone to shield said arc and said weld zone from the open air;
characterized in that:
said welding current feeding mechanism (**8**) comprises:
a circular current receiving plate (**9**), which is fixed to the upper end of said nozzle (**1**) and rotates together with said nozzle (**1**) about said center axis, said current receiving plate (**9**) having at the center thereof a passage (**10**) for said consumable welding electrode (**4**);
a circular brush (**11**), having substantially the same diameter as that of said current receiving plate (**9**), for feeding said welding current to said current receiving plate (**9**), said brush (**11**) having on the upper surface thereof a current feeding plate (**13**), the lower surface of said brush (**11**) and the upper surface of said current receiving plate (**9**) having

a flat contact interface (12) therebetween, and said brush (11) and said current feeding plate (13) having at the center thereof a passage (23) for said consumable welding electrode (4);

a plurality of rods (19) for stationarily holding said brush (11) and said current feeding plate (13) so as to prevent same from rotating together with said nozzle (1) and said current receiving plate (9), the lower halves of said plurality of rods (19) being inserted into said brush (11) and said current feeding plate (13), and the upper end portions of said plurality of rods (19) being secured to a supporting plate (21) fixed to said carriage;

a plurality of springs (22) for applying a pressure onto said contact interface (12) between the lower surface of said brush (11) and the upper surface of said current receiving plate (9), said plurality of springs (22) being provided between said supporting plate (21) and said current feeding plate (13); and,

said pressure applied by said plurality of springs (22) onto said contact interface (12) between the lower surface of said brush (11) and the upper surface of said current receiving plate (9) being such that, when actuating said nozzle rotating mechanism (5), said nozzle (1) and said current receiving plate (9) rotate whereas said brush (11) and said current feeding plate (13) do not rotate, and said welding current smoothly flows from said brush (11) to said current receiving plate (9).

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**4,517,439**

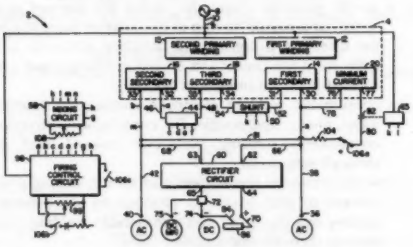
**AC-DC WELDING POWER SUPPLY**

**Bruce H. Colley, 205 Teal Ct., Benicia, Calif. 94510**

**Filed May 7, 1984, Ser. No. 607,862**

**Int. Cl.³ B23K** *9/10*

**U.S. Cl. 219—130.33** **18 Claims**




18. A welding power supply comprising:

a main transformer including a primary winding and first and second secondary winding, said first and second secondary windings connected in series, each said first and second secondary windings having first and second output terminals;

at least one of said secondary windings being partially electromagnetically decoupled from said primary winding to provide a relatively small amount of reactance to the power supply to produce a voltage drop during use equal to between about 5% to 15% of the voltage across said secondary windings when the current through said second secondary winding is about zero;

the first output terminal of said first secondary winding being electrically connected to a first AC supply terminal and the second output terminal of said second secondary winding electrically connected to a second AC supply terminal;

a minimum current secondary winding, electrically connected in parallel with said secondary windings, for providing a source of electrical current at an elevated voltage relative to the voltage across said first and second secondary windings;

a current regulating circuit;

means for electrically connecting said current regulating circuit between said first secondary winding and said second secondary winding thereby aiding isolation of said current regulating circuit from electrical interference;

a rectifier circuit including first and second rectifier input terminals electrically connected to said first and second output terminals of said first and second secondary windings, respectively, said rectifier circuit having first and second rectifier output terminals electrically connected to first and second DC supply terminals;

means for sensing current flow through and voltage drop across at least one of said secondary windings;

adjustable mixing circuit means, electrically connected to said sensing means, for creating a mixed current/voltage signal; and

control circuit means, electrically connected to said adjustable mixing circuit means, for controlling the operation of said current regulating circuit to regulate the current flow through said secondary windings according to said mixed current/voltage signal.

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**4,517,440**

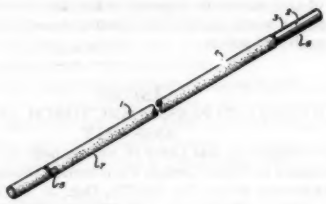
**UNDERWATER ELECTRODE WITH WATERPROOF INTEGRITY**

**Raymond L. Sadauskas, Columbus, and Paul E. Moore, Lancaster, both of Ohio, assignors to Arcair Company, Lancaster, Ohio**

**Filed Feb. 22, 1980, Ser. No. 123,531**

**Int. Cl.³ B23K** *35/02*

**U.S. Cl. 219—145.1** **4 Claims**



1. An electrode for cutting or gouging a workpiece submerged in an aqueous environment comprising in combination:

a generally elongated substrate of a carbonaceous material having a first end for insertion into an underwater torch for carrying electrical current to said electrode and a second end adapted to contact said workpiece for establishing an arc therebetween, said substrate including a cicumferential recess proximate said second end said recess forming a snap-off end on said substrate;

a thin layer of conductive metal covering the entire surface of said substrate; and

a combined electrical insulating and waterproof coating covering said substrate except for said first end, whereby when said first end of said electrode is inserted in said torch said snap-off end can be removed to expose said substrate to said workpiece for striking and maintaining said arc underwater.

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**4,517,441**

**WELDING ELECTRODE**

**Jan Kaljee, Brits; Leo J. Lalor, Benoni; Sergio M. Pagani, Braamfontein, and Frederick P. A. Robinson, Sandton, all of South Africa, assignors to Nasionale Sweisware (Eiendoms) Beperk, Transvaal, South Africa**

**Filed Nov. 10, 1983, Ser. No. 550,544**

**Claims priority, application South Africa, Nov. 12, 1982, 82/8340**

**Int. Cl.³ B23K** *35/22, 35/362*

**U.S. Cl. 219—146.23** **16 Claims**

1. A welding electrode suitable for welding chromium con-

taining ferritic corrosion resistant steels which comprises a low-carbon manganese steel core wire having a carbon content of less than 0.1% by mass, and a manganese content of 0.35–0.60% by mass, and a basic chromium alloyed flux coating, the electrode, upon welding, depositing a low-carbon chromium martensitic ferritic weld metal having a carbon content of less than 0.04% by mass, the core wire having the following composition on a mass basis:

| CONSTITUENT | % mass/mass (m/m) |
|---|---|
| Carbon (C) | 0.10 maximum (max) |
| Silicon (Si) | 0.03 max. |
| Manganese (Mn) | 0.35–0.60 |
| Phosphorous (P) | 0.025 max. |
| Sulphur (S) | 0.025 max. |
| Copper (Cu) | 0.1 max. |
| Chromium (Cr) | 0.2 max. |
| Nickel (Ni) | 0.2 max. |
| Molybdenum (Mo) | 0.2 max. |
| Iron (Fe) | Balance. |

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**4,517,442**

## SHOE PART HEATING APPARATUS

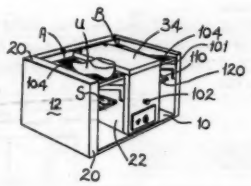
**Frank C. Price; Nigel R. Tout; Raymond Hanson, and Malcolm Tillyard, all of Leicester, England, assignors to USM Corporation, Farmington, Conn.**

**Filed Apr. 7, 1983, Ser. No. 482,869**

**Claims priority, application United Kingdom, Apr. 17, 1982, 8211206**

**Int. Cl.³ H05B** *3/06;* **A43D** *95/12*

**U.S. Cl. 219—215** **15 Claims**




1. An apparatus for use in heating a shoe part to activate adhesive on a surface thereof, the apparatus comprising: a heating plate member arranged to emit infra-red radiation; and

a support for a shoe part on which a shoe part can be positioned to be heated by infra-red radiation emitted by the heating member, wherein the heating member is mounted for movement between a pair of operative positions thereof in which the heating member is operated in opposed static relationship with the support, and an inoperative position thereinbetween in which the heating member is substantially enclosed by infra-red radiation reflecting screens.

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**4,517,443**

## APPARATUS FOR HEATING AND DRYING SHOES

**Klaus Dollst, Averhoffstrasse 24, D-2000 Hamburg 76, Fed. Rep. of Germany**

**Filed Dec. 5, 1983, Ser. No. 558,341**

**Claims priority, application Fed. Rep. of Germany, Dec. 9, 1982, 8234580[U]; May 13, 1983, 8314216[U]**

**Int. Cl.³ A43D** *95/10;* **H05B** *3/06*

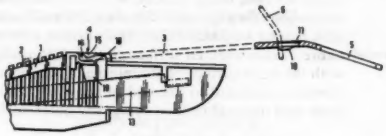
**U.S. Cl. 219—215** **7 Claims**

1. An apparatus for heating and drying a shoe having an inner area and a heel area, the apparatus comprising:

(a) a stretching member having a forward portion adapted to the inner area of the shoe and a rear portion;

(b) electrical resistance heating means arranged in said stretching member;

(c) a clip joined to the rear portion of the stretching member for bracing in the heel area of the shoe; and




(d) means for joining the clip to the rear portion of the stretching member including a snap connection secured against detachment by the electrical resistance heating mean.

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**4,517,444**

## THERMAL PRINTHEAD

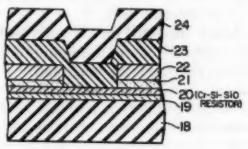
**Tsuneyoshi Kawahito, Yokohama; Katsuo Abe, Yokosuka; Tsuneaki Kamei, Kanagawa; Kazuyuki Fujimoto, Tokyo; Masao Mitani, and Shigetoshi Hiratsuka, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 440,416, Nov. 9, 1982, abandoned. This application Jan. 20, 1984, Ser. No. 572,519**

**Claims priority, application Japan, Nov. 13, 1981, 56-181151**

**Int. Cl.³ G01D** *15/10;* **H05B** *3/00;* **H01C** *1/012*

**U.S. Cl. 219—216** **2 Claims**




1. A thermal printhead comprising an insulating substrate, a heat generating resistor layer formed on said substrate and means for supplying said heat generating resistor layer with electric current, wherein said heat generating resistor layer is made of Cr-Si-SiO alloy, the Cr, Si and SiO contents falling within a region defined by points A, B, C and D in a triangular diagram, where said points A, B, C and D are determined as follows:

| | Cr (mol %) | Si (mol %) | (SiO (mol %) |
|---|---|---|---|
| A | 79.4 | 2.1 | 18.5 |
| B | 58.6 | 40.9 | 0.5 |
| C | 10.1 | 89.4 | 0.5 |
| D | 24.4 | 3.7 | 71.9. |

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**4,517,445**

## VACUUM INSULATED HEAT POT WITH REMOVABLE ELECTRICALLY HEATED RESERVOIR TANK

**Hisao Tatsumi, Nagoya, and Takashi Kawano, Seto, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Jun. 1, 1982, Ser. No. 384,054**

**Int. Cl.³ H05B** *3/00;* **B67D** *5/62;* **F24H** *1/06*

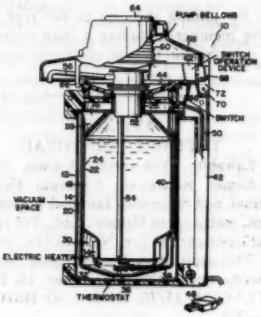
**U.S. Cl. 219—297** **8 Claims**

1. A heat pot for heating and keeping warm a liquid comprising

a vacuum container including an external tank and a cylindrical internal tank having an opening at one end thereof, the internal tank being located within the external tank with its outer surface spaced from inner surface of the

external tank at a certain distance to define a vacuum region between its outer surface and the inner surface of the external tank;

a reservoir tank for accommodating the liquid therein, the reservoir tank being located within the internal tank and removable through said opening thereof, said reservoir tank having a cylindrical central portion, substantially the entire circumferential surface of which is in close contact with the inner surface of the internal tank, and a lower end portion connected to one end of the central portion apart from said internal tank opening, the outer surface of said




lower end portion being spaced from the inner surface of said internal tank to define a substantially sealed heater mounting room between its outer surface and the inner surface of the internal tank;

an electric heater mounted on the outer surface of the reservoir tank within the heater mounting room for heating the liquid within the reservoir tank; and

a power supply wire connected with the heater and led, along the length of the reservoir tank, to the outside of the vacuum container through the opening of the internal tank of the vacuum container for supplying the heater with electricity.

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**4,517,446**

## HEATING SHELF

**Ralph R. Torning, Glastonbury, Conn., assignor to Safeway Products Inc., Middletown, Conn.**

**Continuation-in-part of Ser. No. 310,618, Oct. 13, 1981, abandoned. This application Apr. 26, 1982, Ser. No. 372,183**

**Int. Cl.**[3] **F27D** *11/02*

**U.S. Cl. 219—386** **19 Claims**

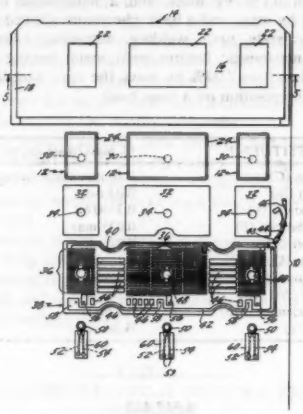
1. In apparatus for selectively heating at least a first portion of planar support without significant heat transfer to adjacent portions, the support including upper and lower housing defining members of thermally and electrically insulated material, the upper housing defining member including a flat surface with at least a first aperture therein, the improvement comprising:

a plate, said plate being commensurate in size and shape with the first aperture in the upper housing defining member, said plate being retained in the upper housing defining member first aperture, said plate having a planar upper surface, said plate having a recess in a lower surface disposed oppositely with respect to said upper surface, said plate having a peripheral portion, said plate being comprised of a material having high thermal conductively;

heater means, said heater means including an electric current responsive heating element;

means securing said heater means in close proximity to said plate lower surface, said securing means electrically insulating said heating element from said plate while establishing an intimate heat transfer relationship;

thermal insulating means, said thermal insulating means being positioned adjacent to said heater means on the side of said heater means disposed oppositely with respect to said plate; and



means responsive to the temperature of said plate upper surface for controlling said heater means, said temperature responsive means including a temperature sensor positioned in said plate lower surface recess.

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**4,517,447**

## FOOD PROCESSING APPARATUS

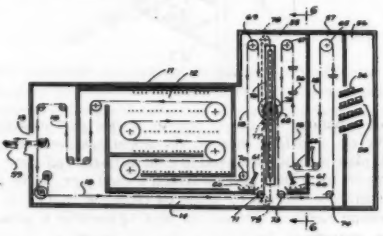
**Kevin J. Hicks, 29-33 King St., Hornsby, New South Wales 2077, Australia**

**Filed Jun. 27, 1983, Ser. No. 508,478**

**Claims priority, application Australia, Aug. 17, 1982, PF5432**

**Int. Cl.**[3] **F27B** *9/06;* **A21B** *1/22;* **A21C** *13/02*

**U.S. Cl. 219—388** **12 Claims**



1. An oven comprising a baking chamber having an inlet which communicates with a lower region of the chamber, an outlet which communicates with an upper region of the chamber, an endless conveyor extending through the chamber and directed to follow a generally serpentine path which includes a plurality of horizontal passes at successively higher levels in the chamber, product support trays carried by the conveyor at spaced intervals along the length of the conveyor, a bank of horizontally disposed electric heating elements located at a level between each of the horizontal passes of the conveyor, means for sensing the temperature level in various regions of the chamber, means associated with the sensing means for controlling current flow to the heating elements whereby the temperature level in the various regions may be maintained substantially constant at selected levels, and a horizontally extending first tunnel located in the lowermost region of the chamber and connecting the inlet to the chamber by way of a horizontally extending second tunnel which is located immediately above the first tunnel and which extends in a direction

opposite to that of the first tunnel, first and second heat shields which are constituted by roof portions of the first and second tunnels respectively, the heat shields being disposed to prevent heat from being radiated downwardly onto the product support trays during their conveyance through the tunnels, and a lowermost said bank of heating elements located in the second tunnel below the level of the horizontal pass made through the second tunnel by the conveyor.

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**4,517,448**

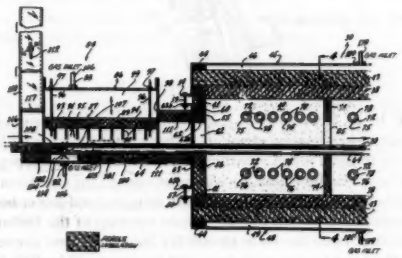
## INFRARED FURNACE WITH ATMOSPHERE CONTROL CAPABILITY

**N. Robert Crain, Huntington Beach, and Carson T. Richert, Buena Park, both of Calif., assignors to Radiant Technology Corporation, Cerritos, Calif.**

**Continuation-in-part of Ser. No. 119,496, Feb. 7, 1980, abandoned, and Ser. No. 306,200, Sep. 28, 1981, abandoned. This application Nov. 6, 1981, Ser. No. 319,096**

**Int. Cl.³ F27B *9/04*; F27D *7/02***

**U.S. Cl. 219—388** **45 Claims**



1. An infrared furnace comprising:

an elongated rectangularly shaped heating chamber having its interior top, bottom, side, and end walls formed of sheets of porous insulation;

a sheet metal housing enclosing the insulating walls of said heating chamber;

a conveyor belt passing into and out of the heating chamber through openings provided in the end walls thereof;

a first series of infrared heating elements in said heating chamber transversely disposed above said conveyor belt with their terminal ends extended through the side walls thereof;

a second series of infrared heating elements in said heating chamber transversely disposed below said conveyor belt with their terminal ends extending through the side walls thereof;

an upper plenum chamber formed between the top insulating wall of said heating chamber and the top wall of said sheet metal housing;

a lower plenum chamber formed between the bottom insulating wall of said heating chamber and the bottom wall of said sheet metal housing; and

means for introducing a pressurized cover gas into the upper and lower plenum chambers which filters through the porous upper and lower insulating walls of said heating chamber into the interior thereof.

**4,517,449**

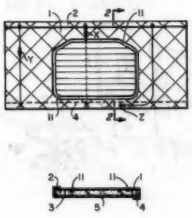
## LAMINAR ELECTRICAL HEATERS

**David Chazan, Palo Alto, and Michael J. Katila, Redwood City, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Filed May 11, 1983, Ser. No. 493,445**

**Int. Cl.³ H05B *3/34***

**U.S. Cl. 219—549** **17 Claims**



1. A laminar heater which comprises

(1) a first laminar electrode which has low electrical resistance through the thickness thereof but has substantial electrical resistance along the thickness thereof;

(2) a first electrical connection means which

(a) makes distributed electrical contact with the first electrode in a first contact zone, and

(b) can be connected to a source of electrical power;

(3) a second laminar electrode which has low electrical resistance through the thickness thereof but has substantial electrical resistance along the thickness thereof;

(4) a second electrical connection means which

(a) makes distributed electrical contact with the second electrode in a second contact zone which is offset from the first contact zone, and

(b) can be connected to a source of electrical power; and

(5) a laminar resistive element which has substantial electrical resistance through the thickness thereof and which is sandwiched between the first and second electrodes;

said heater comprising

(a) a heating area which lies between the first contact zone and the second contact zone, in which, when the first and second connection means are connected to a source of electrical power, current flows through the thickness of the resistive element between the electrodes, and

(b) a connection area which lies between the first contact zone and the second contact zone in which the resistive element and the second electrode are present, and in which, if both electrodes are present, at least one of the electrodes is electrically insulated from the resistive element so that, when the first and second connection means are connected to a source of electrical power, heat is not generated in the resistive element in the connection area;

and the second electrical connection means being so connected to the second electrode that there are points on the second electrode which are in the heating area and which are connected to the second connection means by a path of least electrical resistance which passes through the connection area.

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**4,517,450**

## DETECTING DEVICE IN PARTICULAR FOR DRIVING A BICYCLE COUNTER

**Maurice Coue, Feucherolles, France, assignor to Huret et ses Fils, Nanterre, France**

**Filed May 3, 1983, Ser. No. 491,079**

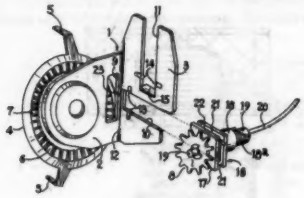
**Claims priority, application France, May 6, 1982, 82 07912**

**Int. Cl.³ G01C *22/00***

**U.S. Cl. 235—95 R** **13 Claims**

1. A device for detecting motion of a rotary element such as a wheel, comprising an L-shaped support bracket having two branches, a disc for drivenly engaging the rotary element and

rotatively mounted on one of said branches, a member constituting a bearing, means for mounting said member constituting a bearing on the other of said branches, a motion take-off head of transmission means rotatively mounted in said member constituting a bearing, counter-transmission and speed-changing means interposed between and drivingly interconnecting the disc and said motion take-off head, said mounting means



for mounting said member constituting a bearing on said other branch enabling the support bracket and the member constituting a bearing to occupy a plurality of different fixed relative positions, said counter-transmission and speed-changing means being part of a set of counter-transmission and speed-changing means which correspond to the various relative positions of the support bracket and the member constituting a bearing.

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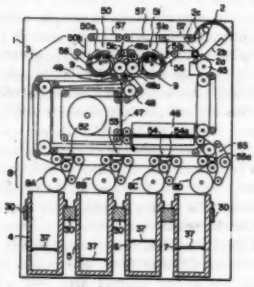
**4,517,451**

## NOTE TRANSFER MECHANISM IN AUTOMATIC MONEY DEPOSITING AND DISBURSING MACHINE

**Eiichi Kokubo; Junichi Arikawa; Kowichi Goi, and Shinichi Imura, all of Tokyo, Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan**

**Filed Sep. 29, 1982, Ser. No. 427,607**
**Claims priority, application Japan, Oct. 15, 1981, 56-164436**
**Int. Cl.³ G06F *15/30***
**U.S. Cl. 235—379** **3 Claims**



1. An automatic money depositing and disbursing machine in which notes thrown in a transacting port are transferred into a discriminating section to detect the presence or absence of abnormal notes and receive normal notes and at least portions of the received notes are used as notes to be defrayed, which comprises:

(a) at least one pressing member movably supported to be vertically moved toward an upper opening of each note accumulating box,

(b) a pulse driven motor connected to the pressing member through a connecting mechanism for vertically moving and setting the pressing member in a position by forward and reverse rotation pulses,

(c) a position data memory for renewing memorized position data for the pressing member by adding the forward rotation pulses to the position data or subtracting the reverse rotation pulses from the position data, and

(d) a judging section for issuing a near-end signal by the position data for the pressing member memorized in the position data memory when the quantity of notes accumulated in each box becomes less than a previously set quantity of notes.

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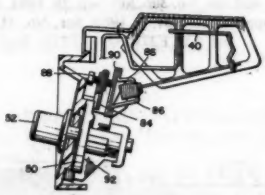
**4,517,452**

## ELECTRIC TOASTER OVEN BROILER CONTROL

**Charles Z. Krasznai, Trumbull, and Richard L. Norwood, Waterbury, both of Conn., assignors to Black & Decker Inc., Newark, Del.**

**Filed Oct. 31, 1983, Ser. No. 547,034**
**Int. Cl.³ F27D *11/02*; A21B *1/40***
**U.S. Cl. 219—413** **5 Claims**



1. In an electric oven toaster including upper heating elements, lower heating elements, a thermostat switch which may be set to open when a particular preset threshold temperature has been reached, a main switch for energizing and deenergizing the oven toaster including both its upper and lower heating elements, and means operated upon opening of the thermostat switch to open the main switch for energizing and deenergizing the oven toaster including both its upper and lower heating elements, and means operated upon opening of the thermostat switch to open the main switch to deenergize both the upper and lower heating elements when the particular temperature set by the thermostat is reached, the improvement comprising:

a. a manually operable cam for setting the threshold temperature of the thermostat switch;

b. said thermostat switch including a temperature sensor, a first movable switch blade with a contact mounted thereon, said first movable switch blade being positioned for movement by said temperature sensor, and a second movable switch blade with a contact mounted thereon movable to a plurality of positions;

c. a cam follower blade positioned between said manually operable cam and said second movable switch blade;

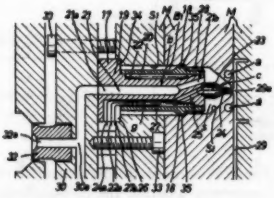
d. said cam follower blade including a generally flat mounting portion, a short blade portion integrally formed with the mounting portion, and a slide portion urged into sliding contact with said manually operable cam;

e. an adjusting screw threaded through the short blade portion between the mounting portion and the slide portion, said adjusting screw having an end portion in contact with said second movable switch blade so that the position of said cam may be manually adjusted to accurately move the short blade portion to accurately move the end of said adjusting screw to accurately set a position of the contact on the second movable switch blade to set the threshold temperature of said oven toaster.

## 4,517,453
## HOT TIP BUSHING MEANS FOR A SYNTHETIC RESIN INJECTION MOLDING MACHINE

**Shigeru Tsutsumi, Yamagata, Japan**

**Filed Jan. 24, 1984, Ser. No. 573,828**
**Claims priority, application Japan, Feb. 2, 1983, 58-14519**
**Int. Cl.³ F27B *14/06***
**U.S. Cl. 219—421** **5 Claims**

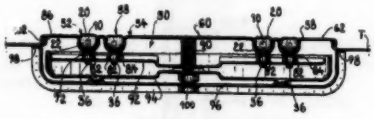


1. Hot tip bushing means for a synthetic resin injection molding machine comprising:
- a cylindrical body of heat conductive material;
- a heating tip of heat conductive material provided with first heating means inside of said tip secured on the front of said cylindrical body and having a pointed end;
- a straight resin flow passage formed axially in the interior of said cylindrical body and communicating with a side portion of said heating tip;
- second heating means provided inside adjacent the periphery of said cylindrical body for heating resin passing through said straight flow passage; and
- means on said cylindrical body near said heating tip for sealably positioning said tip in a mold sprue.

## 4,517,454
## ELECTRIC HEATING ELEMENT, AND A HOT PLATE EQUIPPED WITH THE HEATING ELEMENT

**Jean Mantelet, Paris, France, assignor to Cuisi-Technic S.a.r.l., Paris, France**

**Filed Nov. 29, 1983, Ser. No. 556,169**
**Claims priority, application France, Mar. 31, 1983, 83 05377; Dec. 9, 1983, 83 14469**
**Int. Cl.³ H05B *3/68***
**U.S. Cl. 219—455** **8 Claims**

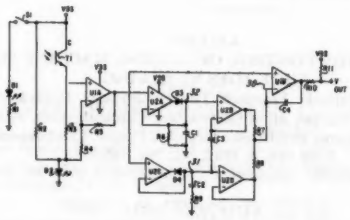


1. A hot plate for heating cooking vessels, equipped with at least one electric heating element in the shape of a closed ring (52, 53) arranged horizontally in a support (50) and having an upper face (20) forming a heating plane (P) on which the bottoms of the cooking vessels (R) are directly placed, the lower face (22) of the ring carrying electric end terminals (12, 14) and at least a fixing metal lug (36), said terminals and lug extending downwardly, said support (50) comprising a metal plate (54) arranged horizontally in which an annular groove (56, 57) is chased, said groove opening upwardly and receiving the heating element (52, 53), the depth of the groove being such that the upper face (20) of the heating element projects slightly above the upper face (58) of the plate (54), and the width (64) of the groove being substantially the same as the width (66) of the heating element such that there are substantially no gaps between the edges of the groove and the peripheral edges of the heating elements, at least one aperture (70) through which the end terminals (12, 14) extend being provided in the bottom of the groove, and at least one hole (72) for receiving the metal lug being provided in the bottom of the groove.

## 4,517,455
## DUAL PEAK DETECTOR

**Willie B. Benitez, III, Lubbock, and Billy R. Masten, Shallowater, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Oct. 4, 1982, Ser. No. 432,626**
**Int. Cl.³ G06K *7/10***
**U.S. Cl. 235—463** **9 Claims**

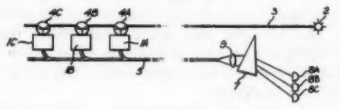


1. A dual peak detector circuit comprising:
- a first circuit means for receiving an input voltage and storing the maximum value of said input voltage;
- a second circuit means for receiving said input voltage and storing the minimum value of said input voltage; and
- a third circuit means connected to said first and said second circuit means, said third circuit means for providing an output when said input voltage transitions from said maximum value to said minimum value by storing a selected portion of the voltage difference between said maximum voltage and said minimum voltage and providing said output when said input voltage is less than the sum of the selected portion and the minimum voltage.

## 4,517,456
## COLOR MULTIPLEXING PASSIVE SENSOR ARRAY

**James R. Halsall, Runcorn, and Robert T. Murray, Helsby, both of England, assignors to Imperial Chemical Industries PLC, Hertfordshire, England**

**Filed Dec. 8, 1981, Ser. No. 328,712**
**Claims priority, application United Kingdom, Dec. 17, 1980, 8040394**
**Int. Cl.³ G01J *3/34***
**U.S. Cl. 250—226** **20 Claims**



1. Apparatus for gathering data about a plurality of chemical or physical conditions comprises:
- (a) a plurality of passive optical sensors to modify light supplied to them as a function of changes in physical or chemical conditions applied to them;
- (b) means for providing light for the sensors, comprising a broadband or multiband light source remote from the sensors and an optical fibre to distribute light from the source for access on behalf of each sensor;
- (c) a plurality of dichroic beam splitters accessing the light distribution fibre to extract selected colours therefrom in turn while allowing the remainder of the light to continue along the distribution fibre for access by subsequent beam splitters, the colour extracted by each beam splitter being

supplied to a single sensor and being different from that supplied to the other sensors, the breadth of the light source waveband or numbers of wavebands being at least sufficient to include all the colours selected for supply to the sensors;

(d) an optical fibre data bus connected to receive light from each of the sensors and to convey it to a place remote from the sensors;

(e) means for separating each of the selected colours from other light conveyed by the data bus; and

(f) detection means connected to receive the separated colours for measuring or detecting modifications made to each colour by the sensors.

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**4,517,457**

## DEVICE FOR CONTROL OF LASTING MACHINE FOR SHOE TOES BY GLUING

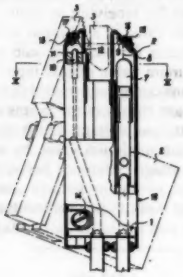
**Miloslav Valásek; Frantisek Langer; Jaroslav Hrádek, and Jindrich Seeman, all of Gottwaldov,, Czechoslovakia, assignors to Tovarny strojirenske techniky, Prague, Czechoslovakia**

**Filed Feb. 4, 1982, Ser. No. 345,588**

**Claims priority, application Czechoslovakia, Feb. 16, 1981, 1091-81**

**Int. Cl.³ A43D *21/00*; H01J *5/02***

**U.S. Cl. 250—239** **4 Claims**



1. In a lasting machine by which workpieces are assembled into shoes, a plurality of mold sections, each of said sections having a pair of plier bodies and a workpiece engaging jaw operably movable therebetween photoelectric apparatus for sensing the position of said workpiece in at least one of said mold sections and for providing a signal thereof comprising a light source mounted on one of the plier bodies of said at least one mold section, photo transistor mounted on the associated plier body, mirror means arranged to project the light from said source to said photo transistor intersecting the path of the associated jaw between said pliers, said photo transistor adapted to provide an electrical signal on interruption of said light by said workpiece which causes the closing of the associated jaw on said workpiece.

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**4,517,458**

## REMOTE DETECTION OF HYDROCARBON SEEPS

**Anthony R. Barringer, 25060 Montane Dr. W., Golden, Colo. 80401**

**Filed Nov. 23, 1981, Ser. No. 324,248**

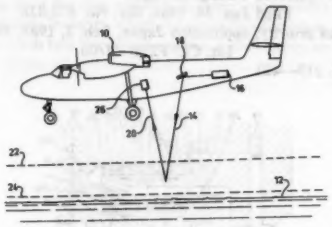
**Int. Cl.³ G01V *5/00***

**U.S. Cl. 250—253** **18 Claims**

1. A method of interrogating aerosols formed above a sea or earth surface to detect hydrocarbon gas seeps below the surface, comprising the steps of:

generating a beam of primary light radiation and directing the beam towards the surface, the beam being sufficiently intense and of such a spectral composition that the beam causes the aerosols to emit secondary light radiation;

detecting the secondary light radiation emanating from the aerosols; and,



analysing the spectral content of the detected secondary radiation to determine whether the composition of aerosols indicates the existence of a hydrocarbon gas seep.

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**4,517,459**

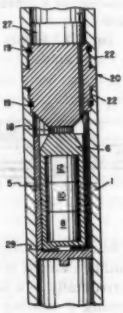
## TEMPERATURE STABILIZATION SYSTEM FOR A RADIATION DETECTOR IN A WELL LOGGING TOOL

**Albert P. Richter, Jr., and Harold E. Peelman, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Nov. 2, 1981, Ser. No. 317,039**

**Int. Cl.³ G01V *5/00***

**U.S. Cl. 250—261** **8 Claims**



1. A temperature stabilization system for a radiation detector in a well logging tool comprising means for sensing the temperature in a well logging tool and providing a corresponding temperature signal,

means located within said logging tool and containing the radiation detector tool for providing a controllable temperature environment for the radiation detector,

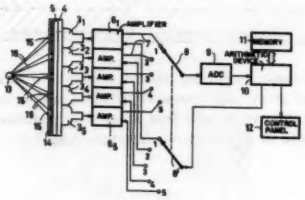
means responsive to the temperature signal for transferring heat from the environment means so as to stabilize the temperature in the environment means for the radiation detector, and

means for disposing of transferred heat from the heat transfer means

## 4,517,460
## METHOD OF CALIBRATING A GAMMA CAMERA, AND A GAMMA CAMERA INCLUDING A CALIBRATION DEVICE

Hendrik J. Meulenbrugge, and Harm Fortuin, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 18, 1982, Ser. No. 389,637
Claims priority, application Netherlands, Jun. 24, 1981, 8103058
Int. Cl.³ G01D *18/00*
U.S. Cl. 250—252.1 11 Claims



1. A method of calibrating a gamma camera comprising the steps of positioning a point source in front of a scintillation crystal of the scintillation camera, arranging a plurality of photomultiplier tubes behind said scintillation crystal, connecting amplifiers to said photomultiplier tubes, and generating controls signals for calibrating said photomultiplier tubes and said amplifiers,

characterized in that the following steps are carried out

arranging a diaphragm between said point source and said scintillation crystal, said diaphragm being provided with radiation transmitting domains, said domains being arranged in front of centers of said photomultiplier tubes,

sampling output signals of said photomultiplier tubes,

determining a mean amplitude of said output signals associated with relevant photomultiplier tubes for each photomultiplier tube, and

comparing said mean amplitude with a reference value to provide said control signals for controlling gains of at least one of said relevant photomultiplier tubes and associated amplifiers.

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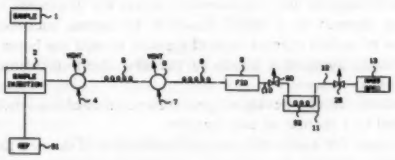
## 4,517,461
## CARBON ISOTOPE ANALYSIS OF HYDROCARBONS

John A. Crandall, c/o Phillips Petroleum Co., Bartlesville, Okla. 74004

Filed Nov. 29, 1982, Ser. No. 445,312
Int. Cl.³ B01D *59/44*
U.S. Cl. 250—282 19 Claims



1. A method comprising:

introducing a sample of matter containing an isotope of interest selected from isotopes of carbon and sulfur into an analytical detector selected from a flame ionization detector and a flame photometric detector operative to combust the sample and to detect a property representative of the presence of carbon or sulfur of the sample or a combustion product thereof, and producing combustion product comprising at least one of carbon dioxide and sulfur dioxide containing the isotope of interest; and

passing at least the isotope of interest portion of the combustion product to a mass spectrometer operative to make a quantitative isotopic analysis of the isotope of interest and producing an output from the mass spectrometer representative of the quantitative isotopic analysis of the isotope of interest.

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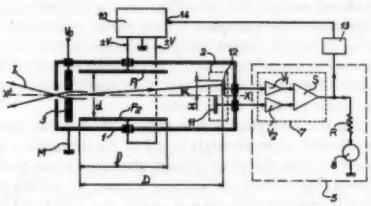
## 4,517,462
## DEVICE FOR MEASURING AN ION CURRENT PRODUCED BY AN ION BEAM

Robert Boyer, Pierrelatte, and Claude Duval, Saint Paul Trois Chateaux, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 18, 1982, Ser. No. 434,835
Claims priority, application France, Oct. 21, 1981, 81 19760
Int. Cl.³ B01D *59/44*
U.S. Cl. 250—286 7 Claims

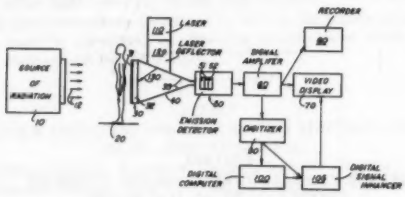


1. A device for measuring an ion current produced by an ion beam, comprising a vacuum chamber connected to a reference earth, a diaphragm for introducing the ion beam into said chamber and which is located at one end of the chamber, means for collecting the ions from the diaphragm and which are positioned at the opposite end of the chamber, means located between the diaphragm and the collection means, in order to bring about a periodic modulation of the intensity of the ion current circulating between the collection means and the reference earth, and means for measuring a periodic voltage between the collection means and the references earth, said modulation means comprising deflecting plates located in the chamber and insulated therefrom, said plates being parallel to the direction of the beam of ions from the diaphragm and connected to means for alternately and periodically applying to them opposite potentials, in such a way as to bring about a periodic alternating scanning of the ion beams on the collection means, the latter comprising two juxtaposed collecting electrodes, which are insulated from one another and from the chamber, and which are alternately and periodically scanned by the beam, said measuring means being current or frequency measuring means and comprising an amplifier chain for measuring a periodic voltage or current, said chain having two inputs respectively connected to each collecting electrode, said device further comprising a voltage-frequency converter, wherein one input is connected to an output of the amplifier chain, and wherein one output is connected to a control input of the means making it possible to alternately and periodically apply to the deflecting plates opposite potentials, in such a way that the scanning frequency of the collecting electrodes is made dependent on the intensity of the ion current.

## 4,517,463
## METHOD AND APPARATUS FOR REAL-TIME RADIATION IMAGING

**Jean Gasiot, Rue de Baillarguet 474, 34960 Clapiers, Herault, France; Peter F. Braunlich, SW. 730 City View, Pullman, Wash. 99163, and Jean-Pierre Fillard, St. - Gely-du-Fesc, Herault, France**

**Filed Feb. 28, 1983, Ser. No. 470,912**
**Int. Cl.³ G03C 5/16**
**U.S. Cl. 250—327.2** **20 Claims**




1. A method for producing a real-time electronic signal representing a radiation image of a body being examined, comprising:

directing a beam of ionizing radiation at the body and toward a luminescent phosphor screen positioned behind the body; the ionizing radiation causing migration of electrons within the phosphor screen which results in ionization of the phosphor screen; the degree of ionization of the phosphor screen being variable over the screen and dependent upon the amount of ionizing radiation which passes through or around the body and impinges upon a particular point of the screen;

scanning the phosphor screen with a laser beam having a wavelength approximately equal to the stimulation wavelength of the phosphor screen; the laser beam having a photon flux density sufficiently intense to rapidly stimulate the phosphor screen and cause very rapid and nearly complete detrapping of the electrons which migrated during ionization of the phosphor screen; the laser beam scanning across particular points of the phosphor screen so as to provide stimulation of the particular points for time periods of between 50 to 200 nanoseconds;

measuring the luminescent emissions which result from striking the phosphor screen with the laser beam;

converting the measurements of the luminescent emissions and their associated locations into an electronic signal which is representative of the radiation image impinging upon the phosphor screen; and

synchronizing the luminescent emission measurements for particular points of the screen with the location of the particular points upon the screen.

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## 4,517,464
## SENSOR SYSTEM

**James E. Heath, and Hilmer W. Swenson, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 30, 1982, Ser. No. 431,866**
**Int. Cl.³ G01T 1/24; H01L 27/14**
**U.S. Cl. 250—370** **8 Claims**

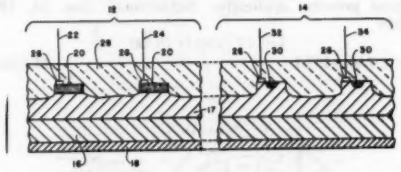
1. A sensor system comprising:

first and second arrays of sensor devices on at least one semiconductor substrate including a photovoltaic material of a first conductivity type;

said sensor devices formed of tri-metal photovoltaic material of a second conductivity type dispersed on said substrate in spaced apart relationship, and forming a plurality of p-n junctions;

said p-n junctions of said sensor devices of said second array having substantially smaller junction area than said junctions of said sensor devices of said first array;

whereby said first array of sensor devices becomes incapable of normal operation before said second array of sensor devices after exposure to a significant amount of radiation; and



an electronic switching means coupled to said first and second arrays and operative to select said second array as an alternative to said first array as a resultant output in response to a cumulative radiation dose.

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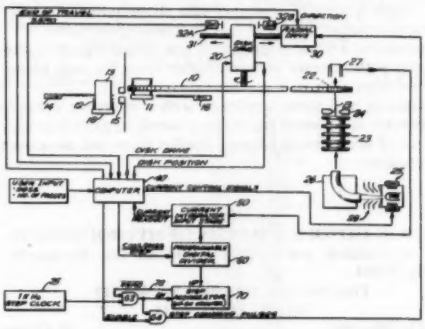
## 4,517,465
## ION IMPLANTATION CONTROL SYSTEM

**Roger B. Gault, and Larry L. Keutzer, both of Austin, Tex., assignors to VEECO/ai, Inc., Austin, Tex.**

**Filed Mar. 29, 1983, Ser. No. 480,095**
**Int. Cl.³ A61K 27/02; H01J 37/00**
**U.S. Cl. 250—492.2** **9 Claims**




1. In an ion implantation system having an ion beam, a rotating wafer support and displacement means for displacing the rotating support in a radial direction to expose successive sections of wafers carried on said support to said ion beam as the rotating support is displaced radially, the improvement comprising:

(a) means for computing a signal indicative of charge delivered to a section of said support;

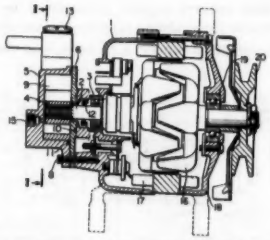
(b) means for generating a signal indicative of desired dosage;

(c) displacement control means responsive to said charge and dosage signals for producing a signal for causing a sequence of predetermined incremental displacements of said support by said displacement means, and wherein each incremental displacement occurs at substantially the same velocity with the number of said incremental displacements being responsive to the values of said charge and dosage signals.

## 4,517,466
## VACUUM PUMP

Hitoshi Ogawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP82/00323, § 371 Date Mar. 24, 1983, § 102(e) Date Mar. 24, 1983, PCT Pub. No. WO83/00668, PCT Pub. Date Mar. 3, 1983
PCT Filed Aug. 18, 1982, Ser. No. 486,280
Claims priority, application Japan, Aug. 18, 1981, 56-122894[U]
Int. Cl.³ F02B 77/00
U.S. Cl. 290—36 R 2 Claims



1. A vacuum pump arrangement comprising:
a. an engine starting motor having a rear bracket and a rotary shaft and means for rotating said rotary shaft;
b. an engine;
c. means for coupling said rotary shaft to said engine to start said engine when said rotary shaft is rotated by said rotating means;
d. means for decoupling said shaft and said engine when said engine is started;
e. a vacuum pump, said vacuum pump including:
(1) a rotor coupled to said shaft so as to be driven by rotation of said shaft,
(2) a housing having an inner cylindrical peripheral surface eccentric to the center of said rotor, and having a suction port and an exhaust port,
(3) a plate between said housing and said bracket closing said housing so as to define an operating compartment within said housing, and
(4) vanes on said rotor, in said operating compartment, rotatable with said rotor in sliding contact with said inner cylindrical peripheral surface, for pumping a fluid from said suction port to said exhaust port;
f. means, responsive to running of said engine, for stopping said starting motor;
g. a vacuum tank and a master bag having a pressure accumulating portion, communicating with said suction port; and
h. means, responsive to a vacuum in at least one of said vacuum tank and said pressure accumulating portion, for starting said starting motor to drive said vacuum pump.

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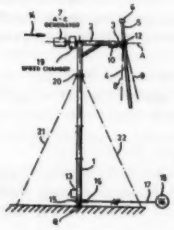
## 4,517,467
## WIND TURBINE WITH GALE PROTECTION

Heinrich Führing, Augsburg, Fed. Rep. of Germany, assignor to Messerschmidt-Bölkow-Blohm GmbH, Ottobrunn, Fed. Rep. of Germany

Filed Jul. 25, 1983, Ser. No. 516,786
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1982, 3227700
Int. Cl.³ F03D 7/02, 7/04
U.S. Cl. 290—44 1 Claim

1. A wind turbine comprising, in combination:
a rotor having wind-driven blade means formed by a single blade on a shaft generally parallel to a prevailing wind direction;
an electrical power generator coupled with said shaft,
said power generator being an alternator connected in operation to an external alternating-current source imposing upon said alternator a synchronous speed less than a theoretical speed at which said rotor would be driven by wind velocities in a predetermined range if disconnected from said external source, said blade having a substantially constant aerodynamic profile in transverse section and a substantially rectangular contour in a longitudinal plane, said shaft being horizontally mounted atop an upright mast rotatable about a vertical axis, said blade being connected with an end of said shaft remote from said mast by a swivel coupling enabling limited swinging in a plane defined by the axis of said mast and said shaft; and
pitch-control means coupled with said blade for varying an angle of inclination included between said shaft and a rear surface of said blade confronting said mast, said pitch-control means including sensing means for orienting said blade in a manner maintaining laminar air flow over at least part of said rear surface with different wind velocities.



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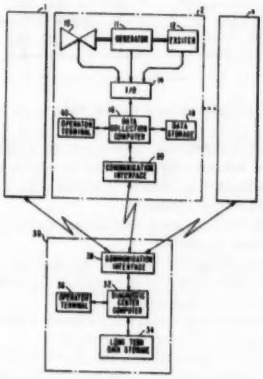
## 4,517,468
## DIAGNOSTIC SYSTEM AND METHOD

Christian T. Kemper, Winter Park; Robert L. Osborne, Winter Springs, and James C. Bellows, Maitland, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 30, 1984, Ser. No. 605,703
Int. Cl.³ G06F 15/16, 15/46
U.S. Cl. 290—52 14 Claims



1. A diagnostic system for monitoring a process at a first location, said process including a plurality of sensors generating output signals related to operating conditions of the process, comprising:
(A) first data storage means at said first location;
(B) first computer means at said first location operable to periodically scan said sensor output signals and place into

said first data storage means those signals which exhibit a predetermined difference from its value from a previous scan and those signals which exceed respective predetermined threshold values;

(C) a diagnostic center at a second location remote from said first location and including second data storage and second computer means operable to perform diagnostic analysis;

(D) first transmitter/receiver means, under control of said first computer means, for transmitting the contents of said first data storage means, via a data link, to said diagnostic center at predetermined scheduled periods of time and for transmitting said contents at an unscheduled period of time whenever a signal exceeds its predetermined threshold;

(E) said diagnostic center including second transmitter/receiver means, under control of said second computer means to receive data sent from said first location whereby said second computer means may perform said diagnostic analysis;

(F) said second transmitter/receiver means being additionally operable to transmit, via said data link, information resulting from said analysis back to said first transmitter/receiver means;

(G) said first transmitter/receiver means being additionally operable to receive said transmitted information.

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**4,517,469**

## CIRCUIT FOR A CURRENT CONSUMING DEVICE IN A MOTOR VEHICLE

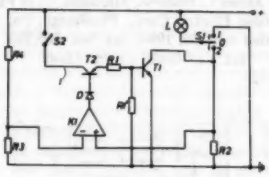
**Axel Bier, Bad Rappenau, Fed. Rep. of Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Fed. Rep. of Germany**

**Filed May 10, 1983, Ser. No. 493,207**

**Claims priority, application Fed. Rep. of Germany, May 15, 1982, 3218479**

**Int. Cl.³ B60Q** *3/02*

**U.S. Cl. 307—10 LS** **3 Claims**




1. A circuit for activating a motor vehicle device comprising:

a first switch operatively connected to a motor vehicle device and having a first position in which the device is directly activated; a second position which disables the device; and a third position;

a door switch for activating said device when a door of said motor vehicle is opened;

a semiconductor switch adapted to activate said device when said first switch is in said third position and said door switch is closed; and

means for deactivating said semiconductor switch when said first switch is in said second position.

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**4,517,470**

## HIGH FREQUENCY INVERTER

**Harold H. Cheffer, Longwood, Fla., assignor to NCR Corporation, Dayton, Ohio**

**Filed Aug. 22, 1983, Ser. No. 525,371**

**Int. Cl.³ H02J** *9/00;* **H02M** *7/537*

**U.S. Cl. 307—64** **15 Claims**

8. In an uninterruptible power supply which includes a main source of A.C. signals for operating a load, an inverter circuit for outputting auxiliary A.C. signals to the load comprising:

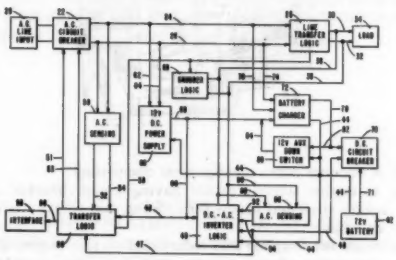
a source of reference A.C. signals;

pulse width modulating means connected to the output of the inverter circuit and receiving said reference A.C. signals for comparing the auxiliary A.C. signals and the reference A.C. signals and outputting a plurality of high frequency clock signals modulated in accordance with the voltage difference between the signals;

a D.C. source;

first switching means including a pair of first and second transistors connected to said modulating means, said transistors outputting said high frequency clock signals when enabled;

a source of first control signals transmitted to said first switching means for enabling said transistors upon failure of the main source to supply A.C. signals to the load;




a first transformer member connected to said pair of first transistors and said D.C. source to output a first portion of the auxiliary A.C. signals;

a second transformer member connected to said pair of second transistors and said D.C. source to output a second portion of the auxiliary A.C. signals;

a source of system clock signals;

second switching means connected to said first and second transformer members for outputting the first and second portions of the auxiliary A.C. signals to the load when enabled; and

control means connected to said second switching means and operated by said system clock signals for enabling said switching means in accordance with said system clock signals whereby said second switching means will output the auxiliary A.C. signals to the load.

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**4,517,471**

## ROTARY CONVERTER MACHINE FOR DIRECT TRANSFER OF ELECTRIC ENERGY BY FLUX LINKAGE BETWEEN WINDINGS ON A STATOR PACK

**Klaus Sachs, Osterode/Harz, Fed. Rep. of Germany, assignor to Anton Piller GmbH & Co. KG, Harz, Fed. Rep. of Germany**

**Filed Jul. 23, 1982, Ser. No. 401,317**

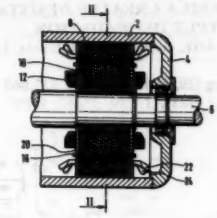
**Claims priority, application Fed. Rep. of Germany, Jul. 29, 1981, 3129928**

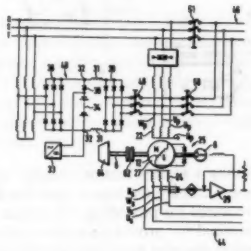
**Int. Cl.³ H02J** *9/08*

**U.S. Cl. 307—67** **17 Claims**

1. A rotary converter machine comprising a stator with a three-phase primary winding and a three-phase secondary winding as well as a rotor being provided with a damping winding and rotatably mounted in the stator, said rotor being provided with a d.c. exciting coil, said primary winding and

said secondary winding being arranged on a common stator pack and located in continuous slots in the stator, each of the





two windings extending over the whole axial length of said common stator pack.

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**4,517,472**

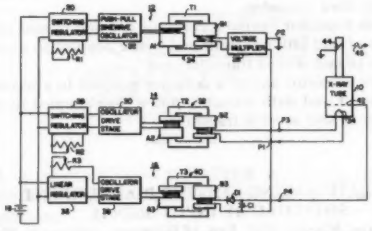
## HIGH VOLTAGE POWER SUPPLY

**Arthur P. Ruitberg, Germantown, and Kenneth M. Young, Lothian, both of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jul. 6, 1983, Ser. No. 511,362**

**Int. Cl.**[3] **H02J** *1/10, 3/46*

**U.S. Cl. 307—82** **18 Claims**



**1**. A high voltage power supply providing a plurality of concurrent output signals, comprising:

input terminal means (**P5**) for providing energization potential from a unidirectional source;

output terminal means (**P1**) for providing a common reference for each of the plurality of concurrent output signals;

a first voltage generating circuit (**12**) comprising:

first oscillator circuit means (**22**) having a first tuned network including first transformer means (**46**), for developing a first sinusoidal signal at the resonant frequency of said first tuned network,

first regulator circuit means (**20**) for developing pulses at a particular repetition rate and duty cycle, for controlling the amplitude of said sinusoidal signal by interrupting the flow of energization potential to said oscillator circuit means from said input terminal means,

second transformer means (**24**) for significantly increasing the amplitude of said sinusoidal signal, and

voltage multiplier and rectifier circuit means (**76, 76'**) including a second output terminal (**P2**), coupled to said second transformer means (**24**) for developing a unidirectional output voltage of several tens of kilovolts amplitude across said common output terminal means (**P1**) and said second output terminal (**P2**);

a second voltage generating circuit (**14**) comprising:

second oscillator circuit means (**30**) having a second tuned network including a third output terminal (**P3**) and third transformer means (**32**) for developing a second sinusoidal signal at the resonant frequency of said tuned network floating at said unidirectional output voltage across said common output means (**P1**) and said third output terminal (**P3**),

second regulator circuit means (**28**) for developing pulses at a particular repetition rate and duty cycle for controlling the amplitude of said second sinusoidal signal by interrupting the flow of energizing potential to said second oscillator circuit means from said input terminal means; and a third voltage generating circuit (**16**) comprising:

third oscillator circuit means (**38**) having a third tuned network including fourth transformer means (**40**), for developing a third sinusoidal signal at the resonant frequency of said third tuned network,

third regulator circuit means (**36**) for controlling the amplitude of said third sinusoidal signal by varying the magnitude of the flow of energizing potential from said input terminal means (**P5**) to said third oscillator circuit means, and rectifier circuit means (D.C.) for converting said third sinusoidal signal into a unidirectional output signal of an amplitude varying slightly from that of said unidirectional output voltage across said first output terminal means (**P1**) and a fourth output terminal (**P4**).

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**4,517,473**

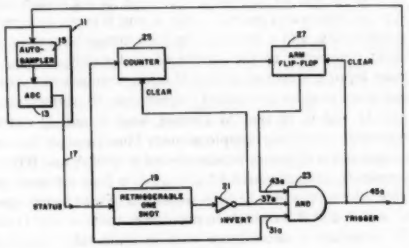
## SOLID-STATE AUTOMATIC INJECTION CONTROL DEVICE

**Dale H. Chidester, Levittown, Pa., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed Jun. 1, 1982, Ser. No. 383,633**

**Int. Cl.**[3] **H03K** *13/00, 17/18, 17/296*

**U.S. Cl. 307—269** **17 Claims**



**1**. An automatic device for use in an instrument which includes a means responsive to a trigger signal to initiate an event; and a data acquisition means adapted to receive and convert data resulting from that event, said data acquisition means having a status output which is in one state when it is available to receive data and in another state when it is not available to receive data and which is pulsed during a conversion cycle; said automatic timing device synchronizing operation of the means responsive to trigger the data acquisition means comprising:

(a) means to count the pulses occurring during a conversion cycle and provide a first output signal when a predetermined count is reached;
(b) means for providing a second output signal a predetermined time after a last pulse is received; and
(c) means for ANDING said status signal in said one state, said first output signal, and said second output signal to provide a trigger output when all three of said signals are present, whereby said trigger signal will be provided only when said data acquisition means are available to receive an input and data acquisition is not in progress.

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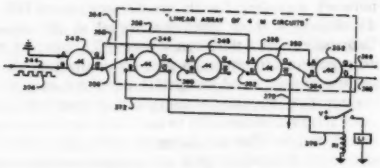
## 4,517,474
## LOGIC CIRCUIT BUILDING BLOCK AND SYSTEMS CONSTRUCTED FROM SAME

**Joseph J. Shepter, New Haven, Conn., assignor to Scientific Circuitry, Inc., Norwalk, Conn.**

**Division of Ser. No. 235,635, Feb. 18, 1981, Pat. No. 4,438,350, which is a division of Ser. No. 852,594, Nov. 17, 1977, Pat. No. 4,257,088, which is a division of Ser. No. 382,891, Jul. 26, 1973, abandoned. This application Jan. 20, 1984, Ser. No. 572,390**

**Int. Cl.³ H03K** *23/04*

**U.S. Cl. 307—272 R** **3 Claims**



1. A logic system which includes a plurality of identical logic circuit building blocks, each referred to as an M Circuit, said M Circuits being connected in a linear array of interconnected M Circuits including first through last M Circuits, said linear array providing a latch operation, said system comprising:

a plurality of M Circuits each of which responds to transitions of a two level binary input signal to provide a memory and a logic function which has a complete truth table for every possible combination of input signal transitions or changes in logic level at a pair of input terminals A and B, each of said M Circuits comprising gating means having two inputs connected to said A and B input terminals, respectively, and a set-reset flip flop means having its set input connected to the output of said gating means, its reset input connected to said B input terminal and its set and reset outputs connected respectively to output terminals Q and $\overline{Q}$ of said M Circuit, said Q and $\overline{Q}$ output terminals providing complementary binary output for any combination of binary inputs applied to said A and B input terminals, whereby said M Circuit is a four terminal device which responds to each transition of said input signal at said A and B terminals to provide outputs at said Q and $\overline{Q}$ terminals in accordance with its truth table function; and

means connecting one of said output terminals of each of the first through next to last M Circuits to the B input terminal of the succeeding M Circuit; means coupling the A input terminals of said M Circuits together, said A input terminals being coupled to a source of an input signal; and means connecting one of said output terminals of the last M Circuit as a reset line to the B input terminal of the first M Circuit; whereby one of said output terminals of said first M Circuit may be provided as a latch output line for operating an output device in response to said input signal.

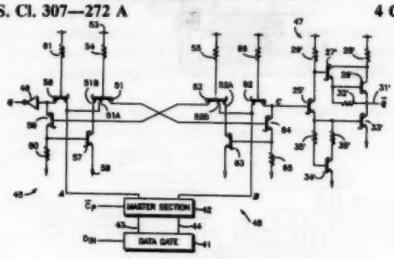
## 4,517,475
## MASTER-SLAVE FLIP-FLOP ARRANGEMENT WITH SLAVE SECTION HAVING A FASTER OUTPUT TRANSISTION AND A GREATER RESISTANCE TO OUTPUT DEGRADATION

**Cleon Petty, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 29, 1983, Ser. No. 527,065**

**Int. Cl.³ H03K** *3/289, 3/287, 3/29*

**U.S. Cl. 307—272 A** **4 Claims**




1. A flip-flop having a master section coupled to receive a data input signal and a clock pulse signal, said flip-flop including a first output terminal for providing a $\overline{Q}$ output signal and a second output terminal for providing a Q output signal, and having a slave section coupled between said first and second output terminals and said master section, said slave section comprising:

a first transistor having a collector to said second output terminal and an emitter coupled to said master section;
a second transistor having a first emitter coupled to said emitter of said first transistor;
a third transistor having a collector coupled to said collector of said first transistor;
a fourth transistor having a collector coupled to a second emitter of said second transistor, and a base coupled to an emitter of said third transistor;
a fifth transistor having a collector coupling to said frst output terminal and an emitter coupled to said master section;
a sixth transistor having a first emitter coupled to said emitter of said fifth transistor and a collector coupled to a base of said third transistor;
a seventh transistor having a collector coupled to said collector of said fifth transistor and a base coupled to a collector of said second transistor; and
an eighth transistor having a collector coupled to a second emitter of said sixth transistor and a base coupled to an emitter of said seventh transistor.

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## 4,517,476
## ECL GATE HAVING EMITTER BIAS CURRENT SWITCHED BY INPUT SIGNAL

**Claude Barre, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Apr. 26, 1983, Ser. No. 488,991**

**Claims priority, application Fed. Rep. of Germany, Apr. 26, 1982, 3215518**

**Int. Cl.³ H03K** *19/086, 19/003*

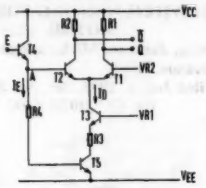
**U.S. Cl. 307—455** **9 Claims**

5. A current mode logic element comprising:

first and second differential amplifier transistors each including a base, an emitter and a collector, said emitters connected to one another, said base of said first transistor serving as an input base, and said base of said second transistor connected to a first reference potential;
first and second resistors respectively connecting said collectors to a first voltage supply potential;

a constant current source connected to said emitters;

at least one input emitter follower comprising a third transistor including a collector connected to the first voltage supply potential, a base for receiving logic signals, and an emitter connected to said input base;




a fourth transistor including a collector connected to said constant current source, an emitter connected to the second voltage supply potential, and a base; and

bias means connected between said base of said fourth transistor and said emitter of said third transistor and providing an approximately constant bias current for said emitter of said third transistor.

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**4,517,477**

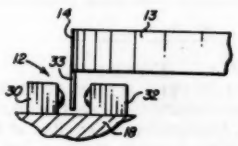
## MAGNETIC MOTOR

**David P. Pankratz, 4611 E. Calle Redonda, Phoenix, Ariz. 85018**

**Continuation-in-part of Ser. No. 927,018, Jul. 24, 1978, abandoned. This application Dec. 26, 1979, Ser. No. 107,030**

**Int. Cl.³ H02K** *7/06*

**U.S. Cl. 310—23** **11 Claims**




1. A magnetic motor for utilizing the energy stored in a permanent magnet to produce rotational force, said motor comprising:

a. a frame;

b. a rotor rotatably carried by said frame;

c. a permanent magnet carried by said rotor and having first and second poles of opposite polarity,

said first and second poles being spaced angularly relative said rotor;

d. magnetic stator means alternating between,

i. a first phase attracting the first pole of said permanent magnet, and

ii. a second phase repelling the second pole of said permanent magnet; and

e. timing means for detecting the position of said permanent magnet and for signalling said stator means for alternating between said first phase and said second phase for urging rotation of said rotor.

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**4,517,478**

## ELECTRIC STEPPER MOTOR

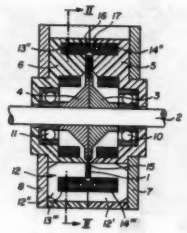
**Claude Oudet, Besancon, France, assignor to Portescap, La Chaux-de-Fonds, Switzerland**

**Filed Apr. 3, 1984, Ser. No. 596,442**

**Claims priority, application Switzerland, Apr. 8, 1983, 1913/83**

**Int. Cl.³ H02K** *37/00*

**U.S. Cl. 310—49 R** **2 Claims**




1. An electric stepper motor comprising a rotary member formed essentially of a disc of magnetic material magnetized axially so as to present on each side of the disc 2N magnetic poles of alternate polarity arranged uniformly along an annular zone, the said rotary member being mounted on the shaft of the motor, the motor comprising in addition a plurality of elemental magnetic circuits which, as a whole, form at least two groups, and at least two electric coils each coupled to a number of elemental circuits belonging to one and the same group, each of these elemental magnetic circuits exhibiting an airgap, all of the airgaps being formed at the same radial distance from the motor shaft and each airgap being in addition substantially symmetrical with respect to the radial plane of symmetry of the magnetized disc, each elemental magnetic circuit including a first and a second flat U-shaped portion of stator of high magnetic permeability arranged essentially radially with respect to the motor shaft, the end of a first arm of the U of a first portion of stator in each circuit being arranged in contact with the end of the first arm of the U of a second portion of stator in the same circuit, the ends of the second arms of the U's of the first and second portions of stator being arranged essentially facing one another at a certain axial distance apart so as to form one of the said airgaps, the said electric coils being arranged respectively round the two arms of the U's of the said first and second portions of stator in the elemental magnetic circuits with which they are coupled, the centre of the end of the second arm of the U of each portion of stator in one elemental magnetic circuit being offset angularly with respect to the centre of the end of the first arm of the U and the two portions of stator in one elemental magnetic circuit being arranged so that the centres of the ends of the first arms of the U's coincide and that the centres of the ends of the second arms of the U's are offset angularly with respect to one another by an angle substantially equal to $\pi/hN$ where h is the order of the harmonic which is to be compensated.

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**4,517,479**

## GENERATOR ARMATURE COOLING AND AIR GAP SEALING SYSTEM

**Mohd A. Aleem, Roscoe, and Alexander Krinickas, Jr., Rockford, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Nov. 7, 1983, Ser. No. 548,945**

**Int. Cl.³ H02K** *9/00*

**U.S. Cl. 310—54** **8 Claims**

1. A rotary electric machine comprising:

a housing;

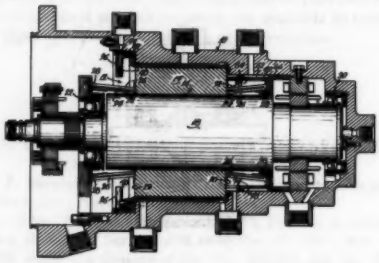
a stator within said housing including an armature having a

winding including layered end turns extending from opposite ends of the armature;

a rotor journalled within said housing and said stator and separated from said stator by an air gap;

at least two nozzles within said housing, one adjacent each end of said armature and directed at the associated end turns;

a pair of partitions within said housing, one for each end of



said armature, each being located axially outwardly of the associated end turns and nozzle;

first air gap sealing means including a resilient gasket sealingly engaging a corresponding one of said partitions and the tips of adjacent end turns and sheet-like seals engaging and conforming to said end turn tips and engaging and gasket; and

second air gap sealing means including sheet-like seals interposed between layers of said end turns.

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**4,517,480**

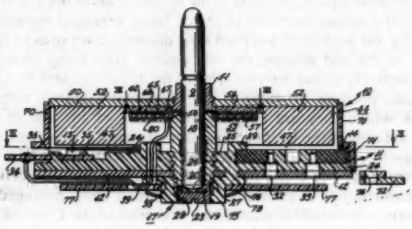
## TACHOGENERATOR FOR SPEED CONTROL OF ELECTRIC MOTORS

**Rolf Müller, St. Georgen, Fed. Rep. of Germany, assignor to Papst Motoren GmbH & Co, KG, St. Georgen, Fed. Rep. of Germany**

**Continuation of Ser. No. 166,806, Jul. 9, 1980, abandoned. This application Mar. 25, 1983, Ser. No. 478,701**

**Int. Cl.³ H02K** *11/00*

**U.S. Cl. 310—68 R** **22 Claims**



**1**. A tachogenerator for speed control of electrical motors having an axial bearing for compensating the axial forces acting on the rotor comprising

a flat multipole permanent magnet solidly connected to the rotor of the motor and having a number p of pairs of magnetic poles on its surface uniformly arranged on a circle of diameter d for the pole centers,

a circular wave winding solidly connected to the stator and separated from the permanent magnet by a flat air gap of a width g and having a number p of angular substantially repeat units of the wave winding wherein p is equal to from about 0.5 to 1.5 times the ratio of the diameter d divided by the width g, with d and g being measured in the same units; and

a corresponding return winding corresponding to the wave winding and disposed running in opposite angular direction to the wave winding for compensating the effect of the wave winding on a magnetic field component in axial direction running through the circle of the wave winding.

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**4,517,481**

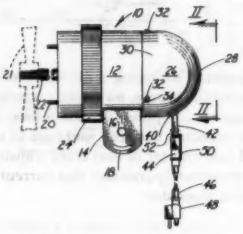
## MODULAR SWITCH HOUSING FOR AN ELECTRIC MOTOR

**Frank E. Breining, Jackson, Mich., assignor to Airmaster Fan Company, Jackson, Mich.**

**Filed Jun. 2, 1983, Ser. No. 500,564**

**Int. Cl.³ H02K** *5/00*

**U.S. Cl. 310—71** **4 Claims**



**1**. In an electric fan having an electric motor having a field coil, a housing including a casing, a front driveshaft end and a rear end, mounting means defined on said casing, the housing including a dome enclosing the motor rear end, and electrical conductors connected to the motor field coil, the improvement comprising an electric switch mounted within the housing dome, a motor capacitor mounted within the housing dome, a power cord mounted upon said housing dome extending thereunto, flexible electric conductors within said dome interconnecting said power cord, switch and capacitor, an electric connector within said housing dome having interconnectable and disconnectable first and second parts, said first connector part being electrically connected to said flexible conductors, said second connector part being electrically connected to the motor field coil, and fastening means releasably attaching said dome to the motor casing whereby release of said fasteners and disconnecting of said electric connector parts permits unitary removal and replacement of the dome, power cord, switch and capacitor.

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**4,517,482**

## VEHICULAR-TYPE ALTERNATOR WITH SPEED-RESPONSIVE FAN COUPLING

**Gerhard Pflüger, Markgröningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Dec. 23, 1983, Ser. No. 564,734**

**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1983, 3305006**

**Int. Cl.³ F16C** *19/12*; **H02K** *7/08*

**U.S. Cl. 310—78** **17 Claims**

**10**. Vehicular-type alternator having

a drive shaft (**12**, **13**);

a drive pulley (**18**) secured to the drive shaft for rotation of the drive shaft;

a fan wheel (**21**);

a ball bearing (**22**) interposed between the fan wheel and the drive shaft;

and means (**20**) for rotating the fan wheel upon rotation of the drive shaft within a limited speed range, but permitting relative rotation of the drive shaft and the fan wheel when the limited speed range is exceeded.

comprising, in accordance with the invention,

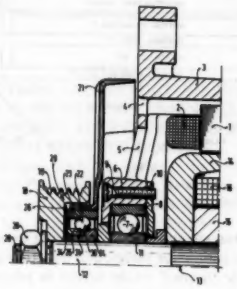
a pair of coaxially aligned inner ball bearing race elements (**24**,**25**) for said ball bearing, located on the drive shaft, one

of the race elements (24) having a hub-like axial extension (34) and the other race element being an axially slidable ring (25) located on said hub-like extension;

an outer race (23) secured to the fan wheel;

balls (22) interposed between said outer race and the pair of race elements,

each race element of said pair having a running surface (30,31) for the balls; and



axial friction force means (26) applying an axial force against said pair of races to frictionally clamp the balls of the ball bearing, during rotation of the shaft within said limited speed range, against the races, but permit relative rotation of the shaft and the fan wheel when the loading reaction force exerted by the fan wheel, upon exceeding the speed range, on the outer race (23) rises above the axially directed friction clamping force.

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**4,517,483**

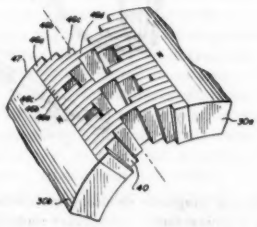
## PERMANENT MAGNET ROTOR WITH SATURABLE FLUX BRIDGES

**David J. Hucker, and Donald A. Straznickas, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 27, 1983, Ser. No. 565,345**

**Int. Cl.³ H02K *21/12***

**U.S. Cl. 310—156** **10 Claims**



1. In a permanent magnet generator having a rotor rotatable within a stator, the stator having windings which develop output voltage in response to rotation of the rotor relative thereto, the output voltage being dependent upon the level of current in the stator windings, a magnetic structure for reducing the dependence of output voltage on the current in the stator windings, comprising:

a magnet on the rotor which develops magnetic flux linking the stator windings;

means connected in a magnetic circuit with the magnet for limiting the flux developed thereby to maintain the output voltage of the permanent magnet machine near a desired level substantially independent of current in the stator windings, wherein the flux limiting means includes a body of magnetically saturable material having means for increasing the flux density therein to a saturation point to thereby limit flux; and

a second magnet spaced apart from the aforementioned magnet and wherein the flux limiting means includes a plurality of magnetically saturable laminations of different lengths, only some of the laminations traversing the entire space between the magnets.

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**4,517,484**

## DOUBLE GAP ELECTRIC GENERATING MACHINES

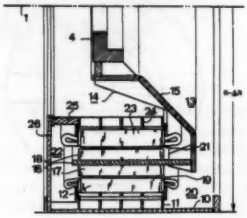
**Jacques Dacier, Mont-sur-Marchienne, Belgium, assignor to Ateliers de Constructions Electriques de Charleroi (ACEC), Brussels, Belgium**

**Filed Feb. 16, 1983, Ser. No. 467,186**

**Claims priority, application European Pat. Off., Feb. 18, 1982, EP82200189.7**

**Int. Cl.³ H02K *1/22***

**U.S. Cl. 310—266** **4 Claims**



1. An electric generating machine having an outer casing, an inner casing, and a shaft, comprising:

a first stator comprising a first annular wound magnetic hub having a first diameter, said first stator being mounted within the outer casing;

a second stator comprising an annular wound magnetic core having a second diameter less than the first diameter mounted about the inner casing so that the second stator is disposed within and concentric with the first stator; and

a rotor comprising:

an annular rim having a third diameter less than the first diameter and greater than the second diameter joined to the shaft, the rim having an inner face and outer face;

a plurality of first polar pieces disposed on the outer face of said rim so as to form a first annular gap between the plurality of said first polar pieces and the first stator; and

a plurality of second polar pieces disposed on the inner face of said rim so as to form a second annular gap between the plurality of said second polar pieces and the second stator, the second annular gap being concentric with the first annular gap.

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**4,517,485**

## HIGH-FREQUENCY PIEZOELECTRIC RESONATOR WITH REINFORCED ELECTRODE CONNECTION

**Marc Berté ; Louis Bidard, and Serge Lechopier, all of Sartrouville, France, assignors to Compagnie d'Electronique et de Piezo-Electricite, Sartrouville, France**

**Filed May 26, 1983, Ser. No. 498,513**

**Claims priority, application France, Jun. 1, 1982, 82 09511**

**Int. Cl.³ H01L *41/08***

**U.S. Cl. 310—320** **2 Claims**

1. A high frequency piezoelectric resonator comprising:

a disk comprising a predetermined thickness of piezoelectric material, said disk defining, in said piezoelectric material, a first surface, said disk including:

means for defining a cavity in the first surface of said disk, said first surface surrounding said cavity, said cavity-defining means including:

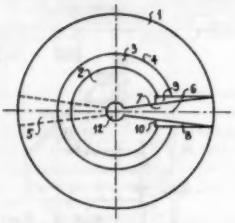
means for defining a second surface, said second surface defined in said piezoelectric material lying within said cavity, and

means for defining, in said piezoelectric material, at least one stepped zone disposed between said first surface and said second surface and connecting said first surface with said second surface; and

electrode means, disposed on said first surface, extending across said stepped zone, and disposed on said second surface, for establishing electrical contact with said second surface, said electrode means including:

an electrode member, and

conductive tongue means, extending across said stepped zone onto a portion of said second surface adjacent to said stepped zone, said conductive tongue means superimposed with said electrode member, said conductive tongue means comprising a layer of metallic film, said conductive tongue means for increasing the reliability



of the electrical contact provided across said stepped zone by said electrode means, wherein:

at least part of said conductive tongue means is disposed on said stepped zone,

at least a part of said electrode member is disposed on the part of said conductive tongue means disposed on said stepped zone, the surface area of the part of said conductive tongue means disposed on said stepped zone being greater than the surface area of the part of said electrode member disposed on the part of said conductive tongue means which is disposed on said stepped zone, and

said electrode member comprises a first portion shaped as a triangle having first and second sides of substantially equal length and a base of a length substantially different from the length of either of said first and second sides, said base being disposed on said first surface at the periphery of said disk, the vertex of said triangle connecting said first and second sides being disposed on said second surface at the center of said cavity.

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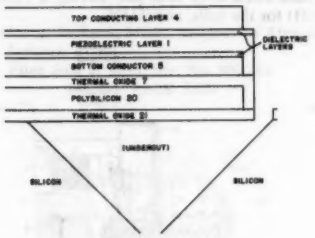
**4,517,486**

## MONOLITIC BAND-PASS FILTER USING PIEZOELECTRIC CANTILEVERS

**Angus P. Andrews, Westlake Village, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 21, 1984, Ser. No. 582,195**
**Int. Cl.³ H01L *41/08***
**U.S. Cl. 310—331** **2 Claims**

1. A device comprising a plurality of cantilever plates arranged in a series format from a first plate down to a last plate; each plate containing a piezoelectric element; conducting elements on each plate sandwiching each piezoelectric element; each of the series of plates except the first plate having the conducting elements adapted to be connected to an output signal of a preceding plate; and said piezoelectric elements and said conducting elements coupling each plate in a series fashion such that the strain caused by a deflection of a preceding plate will be transfered as an electrical signal to the next plate and so on down to the last plate; all plates are all identical to each other and have a resonant frequency; whereby a signal input to the first plate at this resonant frequency will pass through the device substantially unattenuated; and a signal input to the first plate which is not at this resonant frequency will be attenuated in its passage through the device; said piezoelectric element and said conducting elements are formed from thin film continuous layers; said layers being deposited on a silicon substrate;




said silicon substrate and said layers being selectively removed to produce the cantilever plates; and a further polysilicon layer sandwiched by thermal oxide layers is placed between the continuous layers and said silicon substrate so as to give greater mechanical integrity to each plate.

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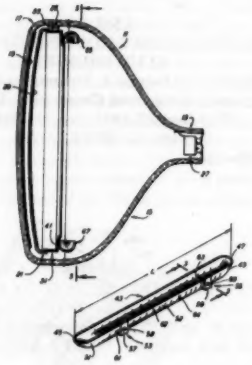
**4,517,487**

## CATHODE RAY TUBE INTERNAL SHIELDING MEANS

**Richard A. Tamburrino, Auburn, N.Y., assignor to North American Philips Consumer Electronics Corp., New York, N.Y.**

**Filed Mar. 14, 1983, Ser. No. 475,266**
**Int. Cl.³ H01J *29/06***
**U.S. Cl. 313—407** **6 Claims**



1. Internal magnetic shielding means for a cathode ray tube having a substantially rectangular multiopening member spatially encompassed by the panel portion of said tube, said member having a perimetrical supporting frame integrally formed of two substantially horizontal framing elements of substantially twelve and six o'clock orientations and two substantially vertical elements of substantially three and nine o'clock orientations, and a continuous rear-oriented instanding ledge formed perimetrically thereabout, said magnetic shielding means comprising:

at least two substantially longitudinal open trough-like metallic shielding members of substantially arcuate cross-section, each of said members being formed free of angular bends as a continuous one-piece structure; a first of said shielding members being affixed horizontally to said twelve o'clock framing element and oriented with the longitudinal opening thereof facing said six o'clock fram-

ing element; and a second of said shielding members being affixed horizontally to said six o'clock framing element and oriented with the longitudinal opening thereof facing said twelve o'clock framing element, and wherein each of said substantially longitudinal shielding members has pedestal-like protruberance means on one side thereof seating on and affixed to the ledge of said frame.

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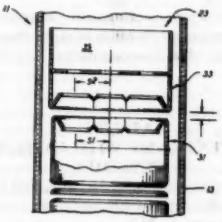
**4,517,488**

## IN-LINE ELECTRON GUN STRUCTURE FOR COLOR CATHODE RAY TUBE HAVING LENSING ELECTRODES WITH TAPERED APERTURES AND BEAM SPOT-SHAPING INSERTS

**Donald L. Say, Waterloo, N.Y., assignor to North American Philips Consumer Electronics Corp., New York, N.Y.**

**Filed Apr. 14, 1983, Ser. No. 484,780**
**Int. Cl.³ H01J *29/50, 29/56***
**U.S. Cl. 313—414** **6 Claims**



1. In an in-line electron gun structure for a color cathode ray tube, a lensing arrangement in the final focusing and accelerating electrodes comprising:

a first lensing structure in the forward portion of the focusing electrode, such structure having three in-line tapered apertures of substantially truncated volumetric configuration having substantially parallel axes of symmetry, each aperture having a front beam exit and a smalller dimensioned rear beam entrance, the entrances and exits separated by sloping sidewalls, a portion of the sidewall of each aperture intersecting with a portion of the sidewall of an adjacent aperture to form an inwardly sloping arcuate rounded saddle along the region of intersection, such structure resulting from the partial overlapping of geometric constructions of the volumetric configurations; and

a second lensing structure in the rear portion of the final accelerating electrode in adjacent, facing relationship with the first structure, such second structure having three in-line tapered apertures of substantially truncated volumetric configuration having substantially parallel axes of symmetry, each aperture having a rear beam entrance and a smaller dimensioned front beam exit, the entrances and exits separated by sloping sidewalls, a portion of the sidewall of each aperture intersecting with a portion of the sidewall of an adjacent aperture to form an inwardly sloping arcuate rounded saddle along the region of intersection, such structure resulting from the partial overlapping of geometric constructions of the volumetric configurations and

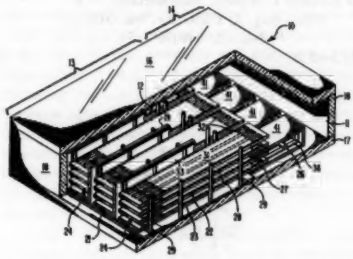
at least one pair of electron beam spot-shaping inserts located in facing relationship in the region of the smaller-dimensioned opening of the central aperture of at least one of said first and second lensing structures, the inserts being about equidistant from the axis of symmetry of the aperture, and separated by a distance less than the diameter of the smaller-dimensioned opening of the aperture.

**4,517,489**

## MODULATOR STRUCTURE AND METHOD FOR FLAT PANEL DISPLAY DEVICES

**Thomas L. Glock, Allentown, and Thomas L. Credelle, Lawrenceville, both of N.J., assignors to RCA Corporation, Princeton, N.J.**

**Filed Sep. 22, 1983, Ser. No. 534,709**
**Int. Cl.³ H01J *29/52***
**U.S. Cl. 313—422** **8 Claims**



1. In a display device having an envelope divided into channels by a plurality of internal support walls, cathode means for supplying electrons for propagation as beams along said channels, and a modulation assembly for modulating said electron beams with video information, said modulation assembly including a pair of electrically connected modulation electrodes arranged on opposite sides of said cathode means for each of said electron beams, and isolation electrode means for electrically separating said pairs of modulation electrodes; an improved modulation assembly wherein:

said isolation electrode means comprises a single substantially U-shaped member; and

each pair of said modulation electrodes is comprised of a bifilar conductive strip configured similarly to said U-shaped member and insulatively affixed to the inside surface of said U-shaped member.

6. A method of making a modulator assembly for modulating electron beams in a display device comprising the steps of:

forming an isolation member in a first blank of material;

forming a plurality of modulation electrode strips in a second blank of material;

insulatively affixing said strips to said isolation member;

separating said strips and said isolation member from said second and first blanks of material;

bending said isolation member and said strips to form a substantially U-shaped modulator assembly having said modulation electrodes on the inside surface of said isolation member.

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**4,517,490**

## DISPERSION TYPE ELECTROLUMINESCENT ELEMENT WITH LIQUID DIELECTRIC AND JELLING AGENT

**Hideo Takahashi, and Mitsuo Nakatani, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 24, 1982, Ser. No. 381,306**
**Claims priority, application Japan, May 27, 1981, 56-79353**
**Int. Cl.³ H05B *33/20***
**U.S. Cl. 313—502** **11 Claims**

1. A dispersion-type electroluminescent element which comprises a pair of juxtaposed electrode plates, and a mixture of a dielectric and an electroluminescent phosphor existing between the electrode plates, the dielectric consisting of:

90 to 99.9% by weight of a liquid dielectric having a dielectric constant of 30 to 80 at a room temperature from −20° to +60° C. and being at least one of cyanoethylated polyol and cyanoethylated phthalic acid ester, and

10 to 0.1% by weight of a gelling agent that is at least one of

peroxyethylene, and acetals as condensates of benzaldehyde or nuclearly substituted benzaldehydes with a polyhydric alcohol having at least 5 hydroxyl groups.

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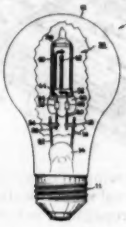
**4,517,491**

## INCANDESCENT LAMP SOURCE UTILIZING AN INTEGRAL CYLINDRICAL TRANSPARENT HEAT MIRROR

**Lee W. Otto, Pepper Pike; John H. Ingold, and Rolf S. Bergman, both of Cleveland Heights, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Aug. 1, 1983, Ser. No. 519,163**
**Int. Cl.³ H01K *1/34***
**U.S. Cl. 313—579** **5 Claims**



1. An improved incandescent lamp comprising:
an outer envelope having an inner envelope spatially disposed in an axial manner therein;
said inner envelope having a tungsten filament of predetermined length spatially disposed coaxially therein, said inner envelope containing a halogen gas and a relatively high pressure inert fill gas;
a light-transmissive cylindrical member of predetermined length and diameter housed within said inner envelope and at least partially surrounding said tungsten filament;
said cylindrical member having an infrared reflecting film covering one of its surfaces, and effective during energization of said filament to intercept and reflect back toward said filament a major portion of the infrared radiation emitted by the filament;
and said infrared film being capable of withstanding and operating effectively at the operating temperature and in the halogen atmospheric environment of the film substrate.

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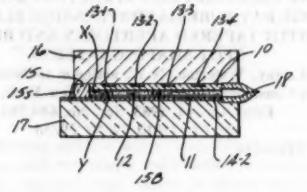
**4,517,492**

## SELECTIVE CONTROL OF DISCHARGE POSITION IN GAS DISCHARGE DISPLAY/MEMORY DEVICE

**Bernard W. Byrum, Jr., Toledo, and Roger E. Ernsthausen, Luckey, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio**

**Continuation-in-part of Ser. No. 482,875, Jun. 25, 1974, Pat. No. 3,942,161, which is a continuation-in-part of Ser. No. 267,102, Jun. 28, 1972, Pat. No. 3,823,394. This application Jun. 2, 1975, Ser. No. 582,950**
**The portion of the term of this patent subsequent to Jul. 9, 1991, has been disclaimed.**
**Int. Cl.³ H01J *17/49***
**U.S. Cl. 313—587** **2 Claims**

1. A display device utilizing gas discharge which is composed of:
(a) a pair of substrates which are facing each other so as to define a discharge gap which is filled with a gas capable of ionization;
(b) a plurality of electrodes which are disposed in parallel on at least one of said substrates on the side thereof closer to said gap; and
(c) dielectric means covering said electrodes and contacting said discharge gap, said dielectric means comprising a first portion which has a high secondary electron emissivity in accordance with a predetermined configuration and a second portion which has a secondary electron emissivity lower than that of said first portion, said second portion




comprising a layer covering said electrodes and said first portion comprising a plurality of strips disposed in contact with said layer of said second dielectric portion and facing said gap.

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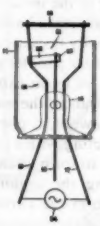
**4,517,493**

## FLUORESCENT LAMP WITH CATHODE HEAT SWITCHES

**Peter V. Dembowski, Richmond Heights, and Quentin D. Dobras, Chesterland, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jan. 27, 1983, Ser. No. 461,348**
**Int. Cl.³ H01J *7/44, 13/46, 19/78, 29/96***
**U.S. Cl. 315—73** **7 Claims**



1. A rapid start type of fluorescent lamp comprising: an elongated bulb; a pair of lamp stems sealing the respective ends of said bulb; each lamp stem comprising a cathode mount having a cathode, first and second lead-in wires extending through said cathode mount for providing operating heating current to the cathode, and a third lead-in wire extending through said cathode mount and connected to said cathode; one of said first and second lead-in wires having a thermally operated switch associated therewith and disposed in operating relationship with said third lead-in wire for turning off said cathode heating current in response to heat from the cathode; and said third lead-in wire comprising a current path bypassing said switch.

5. A method of activating a fluorescent lamp cathode in a lamp having a pair of first and second lead-in wires for providing operating current to the ends of and through the cathode, and a thermally operated cathode current cutout switch interposed in series with said first lead-in wire, wherein the improvement comprises the steps of providing a third lead-in wire connected to the end of the cathode to which said first

lead-in wire provides current, and applying a source of cathode activation current to said second and third lead-in wires.

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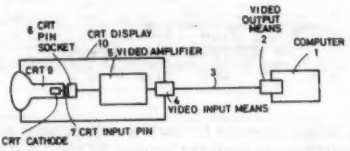
**4,517,494**

## SCREENING STRUCTURE FOR A CATHODE RAY TUBE DISPLAY

**Toru Yasui, Nara, and Haruo Nakatsuji, Ikoma, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 2, 1982, Ser. No. 438,504**
**Claims priority, application Japan, Nov. 9, 1981, 56-180181**
**Int. Cl.³ H01J** *1/52; 5/02*
**U.S. Cl. 315—85** **2 Claims**




1. A screening structure for preventing radiation of electromagnetic waves from a cathode ray tube display comprising:

at least a cathode ray tube pin socket, a cathode ray tube input pin and a video amplifier section joined as one body and enveloped with a first screening member which has high conducting characteristics;

a cathode ray tube cathode section enveloped with a second screening member which has high conducting characteristics, said first and second screening members being in electrical contact with each other;

cable means connected to said amplifier section for providing a video signal thereto and enveloped by a third screening member which has high conducting characteristics, said first and third screening members being in electrical contact with each other; and

means having a low high-frequency impedance for joining said first, second and third screening members to the standard potential part of the cathode ray tube display.

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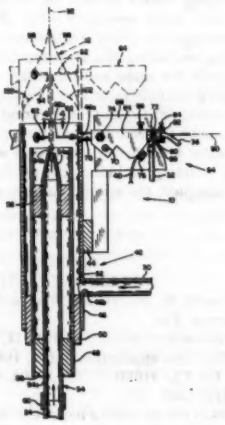
**4,517,495**

## MULTI-ELECTRODE PLASMA SOURCE

**Edward H. Piepmeier, Oregon State University, Department of Chemistry, Corvallis, Oreg. 97331**

**Filed Sep. 21, 1982, Ser. No. 420,749**
**Int. Cl.³ H01J** *7/24;* **H05B** *31/26*
**U.S. Cl. 315—111.21** **9 Claims**



1. A multi-electrode plasma source usable for heating a stream of sample material traveling along a predetermined path comprising

at least one set of at least three spaced-apart electrodes having tips circumferentially distributed about the path in a manner defining a perimeter enclosing the path,

means for applying voltages to said electrodes in such a manner that the maximum average voltage between any one electrode and the other electrodes exists between said one electrode and a circumferentially adjacent electrode, and

means for directing flow of plasma gas into the region of said tips with the flow including flow portions extending between each pair of circumferentially adjacent electrodes,

such tip distribution, voltages and plasma gas flow being appropriate to maintain electrical plasma generally surrounding such a path and extending substantially only between adjacent pairs of electrodes, the plasma thereby forming a substantially closed-loop plasma expanse having a central, generally plasma-free aperture through which the path extends with the plasma gas not flowing toward the path at a flow rate sufficient to effectively extinguish the aperture.

8. A method of heating a stream of sample material traveling along a predetermined path using three electrodes circumferentially disposed about the path in a manner defining a triangle substantially enclosing the path comprising the steps of

applying three-phase voltages to the electrodes,

simultaneously with said applying, directing flow of plasma gas into the region between the electrodes with the flow including flow portions extending between each pair of circumferentially adjacent electrodes,

by said applying and directing, maintaining only an elongated electrical plasma extending between the tips of each pair of circumferentially adjacent electrodes with said directing not being toward the path at a flow rate sufficient to effectively extinguish the aperture, forming thereby, a substantially closed loop plasma expanse having a central, generally plasma-free aperture through which the path extends, and

directing a stream of sample material along the path through the aperture.

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**4,517,496**

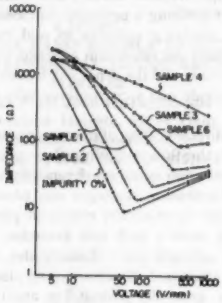
## LIGHTING APPARATUS FOR A DISCHARGE LAMP

**Hiromi Adachi, Kanagawa, and Shoichi Iwaya, Tokyo, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha and TDK Electronics Co., Ltd., both of Tokyo, Japan**

**PCT No. PCT/JP82/00057, § 371 Date Nov. 2, 1982, § 102(e) Date Nov. 2, 1982, PCT Pub. No. WO82/03149, PCT Pub. Date Sep. 16, 1982**
**PCT Filed Mar. 2, 1982, Ser. No. 440,224**
**Claims priority, application Japan, Mar. 2, 1981, 56-28383**
**Int. Cl.³ H05B** *37/00*
**U.S. Cl. 315—227 R** **4 Claims**

1. A lighting apparatus for a discharge lamp comprising a discharge lamp and a current limiting device connected in series with said discharge lamp, wherein said current limiting device is composed of a ferroelectric polycrystalline ceramic having an impedance ratio $Z_1/Z_2$ of a fractional value of 1/10 or less where the impedance $Z_1$ is calculated from the current value measured at an alternating field of 5 V/mm and the impedance $Z_2$ is calculated from the current value measured at an alternating field of 500 V/mm or less, said ferroelectric ceramic comprising mainly barium titanate ($BaTiO_3$) in which

a part of Ba in the $BaTiO_3$ is replaced with Sr or Pb and a part of Ti in the $BaTiO_3$ is replaced with Zr or Sn and a mineralizer




consisting of 0.005 to 0.3% by weight of Cr, 0.005 to 0.3% by weight of Mn, or a combination thereof.

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**4,517,497**

**CAPACITOR DISCHARGE APPARATUS**

**Edgar W. Malone, Goleta, Calif., assignor to Reynolds Industries Inc., Los Angeles, Calif.**

**Filed Nov. 2, 1983, Ser. No. 548,196**

**Int. Cl.³ H05B** *37/00*

**U.S. Cl. 315—241 R** **21 Claims**

1. A capacitor discharge apparatus comprising:

a flat capacitor having a flat terminal projecting from each of two opposite ends and configured such that electrical current flows through it along a short, substantially unidirectional path;

a spark gap device having two spaced electrodes and two flat terminals electrically connected to the respective electrodes; and

a transmission line having an elongated flat insulator strip and two elongated foil conductor strips located on opposite sides of the insulator strip, the transmission line providing two load terminals adapted for connection to a load and connecting directly to the terminals of the capacitor and spark gap device to configure them in series with the two load terminals;

wherein actuation of the spark gap device rapidly discharges any electrical charge stored on the capacitor for conduction through a load connected to the load terminals of the transmission line;

and wherein the electrical current path defined by the capacitor, spark gap device and transmission line is configured such that each path segment is located in close proximity to, but in the opposite direction of, a corresponding path segment, such that the magnetic field created by the current flowing through each path segment is substantially canceled by the magnetic field created by the oppositely-directed current flowing through its corresponding path segment, thereby reducing the series inductance of the apparatus such that it provides a correspondingly increased peak electrical current and a faster current rise time.

**4,517,498**

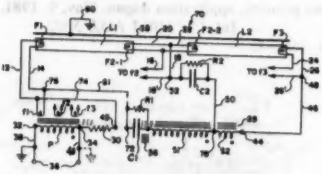
**SEQUENCE START LAMP BALLAST WITH CURRENT SPIKE SUPPRESSION MEANS**

**Joseph A. Crawford, Cook County, Ill., assignor to Advance Transformer Co., Chicago, Ill.**

**Filed Feb. 22, 1982, Ser. No. 351,192**

**Int. Cl.³ H05B** *37/00, 39/00, 41/00*

**U.S. Cl. 315—323** **23 Claims**



1. Ballast apparatus for starting and operating a pair of low pressure gaseous discharge lamps of the rapid start type having end filaments from a source of a.c. power and in which the lamps are connected to be ignited in sequence and operated in series, comprising:

A. an iron core transformer having a primary winding and means for extending the terminals of said primary winding to said source, a secondary winding having a main winding part and an auxiliary winding part closely coupled together, the secondary winding including main and auxiliary winding parts being in transformer relationship with said primary winding whereby to generate an induced voltage when the primary is energized for igniting said lamps, the primary winding being loosely coupled to said secondary winding main and auxiliary winding parts whereby to provide a leakage reactance in the secondary winding for ballasting the lamps when said lamps are both operating,

B. means for connecting the lamps in series with one another and in series with at least the secondary winding,

C. a first capacitor in series with the secondary winding and adapted to be in series with said lamps during operation whereby to provide a leading current when the lamps are both operating and

D. a second capacitor connected with said lamp connecting means and in series with said auxiliary winding part of said secondary winding in such a manner that when the lamps are connected in circuit with said at least secondary winding the second capacitor and auxiliary winding part form a shunting branch around the second lamp,

the apparatus being operative when the primary winding is initially energized to apply the voltage of said at least secondary winding excluding the auxiliary winding part to the first lamp to ignite the same and thereafter the flow of current in said shunting branch generates a voltage across said second capacitor sufficient to ignite the second lamp notwithstanding the presence of the auxiliary winding part in series therewith and thereafter both lamps operate in series with the at least secondary winding including the auxiliary winding part and the first capacitor, the second capacitor being effectively bypassed.

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**4,517,499**

**FLEXIBLE LIGHT**

**John R. Saron, St. Petersburg, Fla., assignor to Key Medical, Inc., Tampa, Fla.**

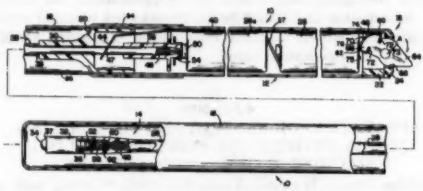
**Continuation-in-part of Ser. No. 314,721, Oct. 26, 1981, Pat. No. 4,347,553. This application Jul. 1, 1982, Ser. No. 394,478**

**Int. Cl.³ H05B** *37/02, 39/06, 41/04, 41/18*

**U.S. Cl. 315—362** **1 Claim**

1. A switch for use with a hand held battery powered device such as a light wherein the hand held device comprises an outer housing configured to retain a battery voltage source

therein and having a light mounted on one end thereof and said switch pivotally mounted on the opposite end thereof and a conductor element extending substantially the length of the outer housing electrically connected to the light; said switch comprising a body including an arcuate cam member having a compound radius formed thereon forming a first and second conductive cam surface, said first conductive cam surface comprising a first substantially flat contact disposed to selectively engage said conductor element and said second conductive cam surface being substantially arcuate to engage the battery voltage source, said arcuate cam member being movable between a first and second position such that said first



conductive cam surface is isolated from said conductor element when said switch is in said first position to deactivate the light and said first conductive cam surface engages said conductor element when in said second position to couple said conductor element to the battery voltage source to actuate the light, said second conductive cam surface engaging the battery voltage source off center relative to the longitudinal axis thereof opposite said conductor element when said switch is in said first position to lock said switch in said first position and engaging the battery voltage source off center relative to the longitudinal axis thereof adjacent said conductor element when said switch is in said second position to lock said switch in said second position.

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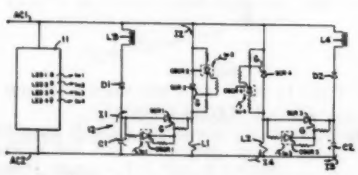
**4,517,500**

## CONTROLLER FOR ELECTROMAGNETIC EXCITER USING POWER LINE SUBHARMONIC

**John D. Gotal, Bristol, R.I., and Junius D. Scott, Homer City, Pa., assignors to FMC Corporation, Chicago, Ill.**

**Filed Nov. 16, 1983, Ser. No. 552,597**
**Int. Cl.³ H02K** *33/00*
**U.S. Cl. 318—130** **9 Claims**



**1.** A controller for operating an electromagnetic exciter at a subharmonic of an electrical power line frequency using a single phase alternating current source for both operating power and for synchronizing said controller with said subharmonic, said controller comprising:

first and second electromagnetic coils;

first and second electrical capacitors;

means for connecting said capacitors to said current source to provide an electrical charge on said capacitors;

means for connecting said first capacitor to said first coil to provide an electrical current through said first coil during a portion of a positive half cycle at said subharmonic frequency;

means for connecting said current source to said first coil to provide additional electrical current through said first coil during said positive half cycle;

means for connecting said second capacitor to said second coil to provide an electrical current through said second coil during a portion of a negative half cycle at said subharmonic frequency; and

means for connecting said current source to said second coil to provide additional electrical current through said second coil during said negative half cycle.

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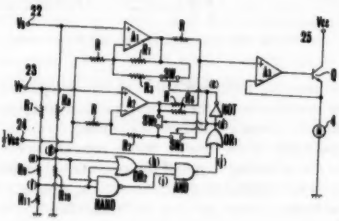
**4,517,501**

## ROTATION CONTROL SYSTEM

**Hiroyuki Takimoto, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 14, 1982, Ser. No. 449,614**
**Claims priority, application Japan, Dec. 15, 1981, 56-203342**
**Int. Cl.³ G05B** *5/00*
**U.S. Cl. 318—314** **37 Claims**



**1.** A control system for a rotator, comprising:

(a) feedback automatic speed control means for controlling the rotation speed of said rotator to a predetermined speed;

(b) feedback automatic phase control means for controlling the rotation phase of said rotator to a predetermined phase;

(c) changeover means for changing over at least one of a loop gain of said speed control means and a loop gain of said phase control means in a changeover period; and

(d) changeover control means for controlling said changeover means in association with the rotation of the rotator.

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**4,517,502**

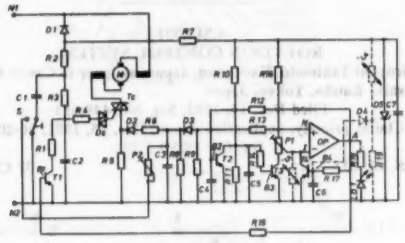
## LOAD MONITORING CIRCUIT FOR ELECTRIC MOTORS

**Hans-Joachim Aschoff, Wuppertal, and Lothar Cholewa, Herne, both of Fed. Rep. of Germany, assignors to Vorwerk & Co. Interholding GmbH, Wuppertal, Fed. Rep. of Germany**

**Filed Mar. 26, 1984, Ser. No. 594,773**
**Claims priority, application Fed. Rep. of Germany, Mar. 31, 1983, 3311771**
**Int. Cl.³ H02P** *1/18*
**U.S. Cl. 318—474** **6 Claims**

**1.** A load monitoring circuit for monitoring different operational conditions of an electric motor having a stator winding, comprising a measuring resistor connected in series with the stator winding to produce an actual load value signal; a variable reference voltage source; a comparison circuit having one input coupled to said measuring resistor, a second input coupled to said variable reference voltage source and an output; means for successively varying the adjustment of the reference voltage source for automatically applying to the second input of the comparison circuit at least three consecutive nominal reference values corresponding to different operational conditions of the electric motor, namely to a maximum nominal reference value corresponding to the starting phase of the motor, a standard nominal reference value corresponding to normal operation of the motor and zero nominal reference voltage value corresponding to an overload, said comparison

circuit includes an operational amplifier having a non-inverting input coupled to said measuring resistor, an inverting input coupled to said variable reference voltage source, and an output, said variable reference voltage source including a voltage divider connected to a power supply for said electric motor and being series connected with a first switching transistor controlled by a timing circuit in response to the starting current of the motor so as to apply during the starting phase a



maximum nominal reference value to the comparison circuit and upon completion of the starting process to apply a standard nominal reference value corresponding to normal operational conditions of the motor; and a second transistor connected to the inverting input of the operational amplifier and having its base coupled to the output of the opertional amplifier so as to adjust the nominal reference voltage to a zero value when an overload is detected by the comparison circuit.

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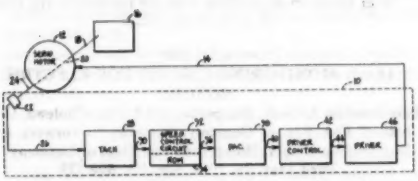
**4,517,503**

## METHOD AND APPARATUS FOR NORMALIZING THE SPEED OF AN ELEMENT POSITIONABLE BY A SERVOMECHANISM

**Frank W. Lin; Suhdok D. Moon, both of Los Altos; Tri S. Van, Union City, and Max I. Anzai, Belmont, all of Calif., assignors to Mechatron Systems, Inc., Sunnyvale, Calif.**

**Filed Sep. 27, 1983, Ser. No. 536,915**
**Int. Cl.³ G05B *13/00***
**U.S. Cl. 318—561** **24 Claims**



1. A method for adjusting the operating speed of a positionable element movable among various positions, comprising the steps of:

providing stored information correlated to a preselected nominal speed of movement for the positionable element during operation;

providing stored information correlated to at least one speed compensation value;

activating means for moving the positionable element;

applying a predetermined drive signal to the moving means for moving the positionable element from a first position to a second position in response to activation of the moving means, the predetermined drive signal being dependent upon the stored information correlated to the preselected nominal speed;

detecting the actual speed of the positionable element during movement from the first position to the second position in response to application of the predetermined drive signal to the moving means;

converting the detected actual speed of the positionable element during movement from the first position to the second position to information correlated to the actual speed of the positionable element during movement from the first position to the second position;

selecting information correlated to a speed compensation value dependent upon the information correlated to the actual speed of the positionable element during movement from the first position to the second position;

storing the selected information correlated to the speed compensation value; and

determining a compensated drive signal from the stored information correlated to the preselected nominal speed and the stored selected information correlated to the speed compensation value.

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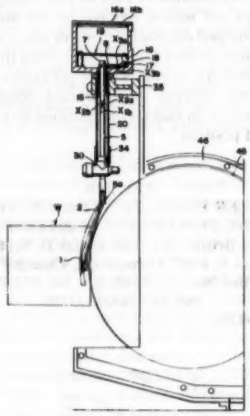
**4,517,504**

## APPARATUS FOR SENSING AND MEMORIZING MODEL PROFILE AND FOR CONTROLLING MACHINING OPERATION THEREBY

**Kunihiko Honji, Ina, and Toshiyuki Aoki, Shiojiri, both of Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Shimosuwa, Japan**

**Filed Mar. 10, 1980, Ser. No. 128,756**
**Claims priority, application Japan, Mar. 12, 1979, 54-28422**
**Int. Cl.³ G05B *19/42***
**U.S. Cl. 318—568** **8 Claims**



1. Automatic machining apparatus comprising

an arm having a machine tool mounted at a tip thereof,

motor means for driving said arm,

a table for mounting and clamping a work model or a work piece to be machined,

motor means for driving said table,

object-contour sensing means for sensing the contour of the work model, said object-contour sensing means being attached to the tip of said arm side-by-side with said machine tool and being detachable or retractable so as not to interrupt operation of the machine tool during machining,

means for manually moving said object-contour sensing means along the contour of the work model in three dimensions, said manually moving means actuating said table driving motor means and said arm driving motor means to sense the contour of the work model, the object-contour sensing means being in abutment with or spaced a predetermined distance from the work model, and

means for memorizing the movements of said table and said arm, and means for actuating the table driving motor

means and the arm driving motor means to move the machine tool in three dimensions relative to the work piece in accordance with the memorized movements, and means for driving the machine tool to effect machining of the work piece.

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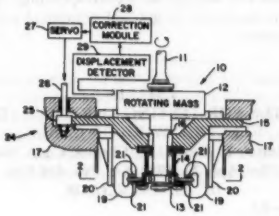
## 4,517,505
## VARIBLE FORCE, EDDY-CURRENT OR MAGNETIC DAMPER

**Robert E. Cunningham, Cleveland, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Feb. 3, 1983, Ser. No. 463,456**
**Int. Cl.[3] G05B** *5/01*
**U.S. Cl. 318—611** **12 Claims**




1. A variable damper for substantially eliminating resonant vibrations in a rotating mass carried on a shaft in a housing and wherein the shaft is provided with at least one bearing, said damper comprising:

a resilient support for said bearing, said support being rotatable about the axis of rotation of said shaft;

a carrier plate for said bearing support comprising a rotatable plate, said bearing support being attached to said carrier plate for rotation therewith;

a plurality of tabs extending radially from said bearing support, said tabs being of electrically conductive, non-magnetic material;

a plurality of magnets equal in number to said plurality of tabs, each magnet having at least one pole face in non-contacting, maximum surface-to-surface confrontation with a respective tab when said plate is in a 0° index position; and

means for rotating said carrier plate whereby said tabs may be positioned from the 0° index position to one in which there is minimum surface-to-surface confrontation between the tabs and respective magnets.

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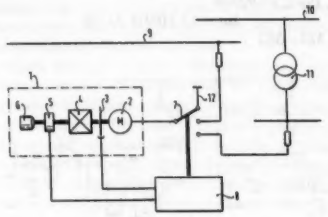
## 4,517,506
## WRENCH PROVIDED WITH AN ALTERNATING CURRENT DRIVE MOTOR

**Wulf-Dieter Heinrich, Wolfsburg, and Henning Otte, Parsau, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**PCT No. PCT/DE81/00230, § 371 Date Jul. 23, 1982, § 102(e) Date Jul. 23, 1982, PCT Pub. No. WO82/02297, PCT Pub. Date Jul. 8, 1982**
**PCT Filed Dec. 18, 1981, Ser. No. 403,621**
**Claims priority, application Fed. Rep. of Germany, Dec. 27, 1980, 3049200**
**Int. Cl.[3] H02P** *5/34*
**U.S. Cl. 318—807** **3 Claims**

1. In a drive of a wrench for tightening screws, a combination comprising an asynchronous drive motor; a torque sensor; cycle control means, said torque sensor being connected to said cycle control means; a medium frequency line; a lower frequency line; and contactor means connected to said drive motor and to said cycle control means, said contactor means being operative for selectively switching said motor to the medium frequency line or from the medium frequency line to the lower frequency line, said drive motor having a rotor sweep frequency which is about the same as the lower line frequency, said torque sensor being operatively connected to said drive motor and immediately connected to the wrench, said torque sensor being operative for supplying signals to said




cycle control means so that said contactor means is actuated by said control means to switch said motor from the medium frequency line to the lower frequency line in response to the signals from said torque sensor when a setting moment on a screw being tightened by the wrench occurs.

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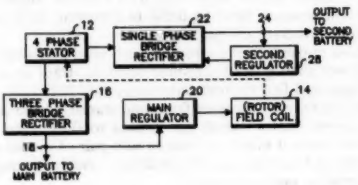
## 4,517,507
## MULTIPLE OUTPUT ALTERNATOR SYSTEM

**Raymond E. Nordbrock, West Chicago, and Richard L. Spears, Union, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 23, 1983, Ser. No. 469,171**
**Int. Cl.[3] H02J** *7/14*
**U.S. Cl. 322—28** **4 Claims**




1. A multiple output alternator system for use with at least two series coupled loads and comprising:

a source of alternating current, said source including a field winding, a three-phase winding and a second winding and supplying two electrically isolated output currents;

a first output terminal for supplying direct current to a first one of said loads;

a second output terminal for supplying direct current to a second one of said loads;

a first rectifier coupled to receive and rectify a first one of said isolated output currents and to supply the rectified current to the first output terminal;

a first regulator coupled to the first output terminal and to the alternating current source for controlling the source outputs in response to the voltage at the first output terminal:

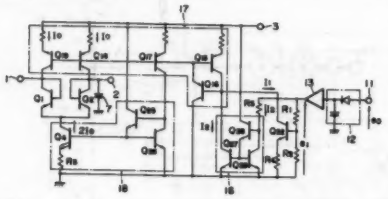
a second rectifier coupled to receive and rectify the second one of said isolated output currents and to supply the rectified current to the second output terminal; and

a second regulator coupled to the second output terminal and to the second rectifier for controlling the second rectifier in response to the voltage at the second output terminal.

## 4,517,508
## VARIABLE IMPEDANCE CIRCUIT

Koichi Sakai, Tokyo, Japan, assignor to Toko, Inc., Tokyo, Japan

Filed May 3, 1983, Ser. No. 491,210
Claims priority, application Japan, May 8, 1982, 57-77330; May 31, 1982, 57-92339
Int. Cl.³ H03H 11/00
U.S. Cl. 323—352 2 Claims



1. A variable impedance circuit, comprising:
a pair of diodes connected with each other;
a first current source circuit coupled to the connection point between said diodes;
a second and a third current source circuit connected to the anodes of said diodes respectively;
terminals provided at the anode sides of said diodes respectively so that a variable impedance element is established therebetween;
a first current mirror circuit for equally controlling forward currents flowing from said second and third current source circuits to said diodes respectively;
a second current mirror circuit for flowing, through said first current source circuit, a current substantially equal to the sum of the forward currents flowing out of said second and third current source circuits;
a transistor driven with a control voltage higher than a predetermined level to draw in a current from said first current mirror circuit; and
a third current mirror circuit driven with a control voltage lower than a predetermined level to draw in a current from said first current mirror circuit;
wherein currents derived from said transistor and said third current mirror circuit are caused to flow, through said first current mirror circuit, in said pair of diodes as equal forward currents, thereby making variable the impedance between said terminals.

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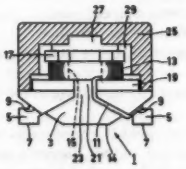
## 4,517,509
## INDUCTIVE DEVICE

Frans H. M. Smeets, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 15, 1982, Ser. No. 441,578
Claims priority, application Netherlands, Nov. 17, 1981, 8105195
Int. Cl.³ H01F 27/24
U.S. Cl. 323—362 7 Claims



1. In an inductive device comprising a winding support having a base with electrical connection points and a ferromagnetic core arranged on the upper side of said base, said core having a cylindrical portion adjacent said base and a noncircumferentially symmetrical upper flange portion, said device further having a winding on said cylindrical portion and a ferromagnetic adjusting cap mounted over said ferromagnetic core and cooperating with said non-circumferentially symmetrical upper flange portion of said core, said cap being rotatable about the axis of the cylindrical portion of said core, said cap further being non-circumferentially symmetrical at least in the vicinity of the upper portion of said core whereby rotation of said cap with respect to the upper flange portion of said core produces changes in the inductance of said winding; the improvement wherein said support further comprises a centering member on said base, said centering member comprising at least one projection from the base having an exterior surface defining a cylindrical or conical surface coaxial with said cylindrical portion of said core, said cap having a portion closely engaging said centering member, at least the interior portion of said cap substantially corresponding in shape and radial dimensions to said cylindrical or conical surface of said centering member.

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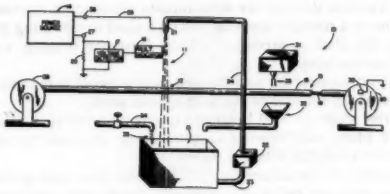
## 4,517,510
## APPARATUS FOR TESTING THE INSULATION OF ELECTRIC WIRE OR CABLE

Henry H. Clinton, 10 Shore Rd., Clinton, Conn. 06410

Filed Apr. 20, 1983, Ser. No. 486,809
Int. Cl.³ G01R 31/08
U.S. Cl. 324—52 16 Claims



1. Apparatus using a conductive liquid for testing the insulation of an insulated wire having at least one electrical conductor and an electrical insulating jacket on the conductor, said apparatus comprising:
means for creating an unconfined stream of electrically conductive liquid flowing past a test station in one direction;
means for applying a first electrical potential to said stream;
means for passing a wire through said stream at said test station in a transverse direction to said one direction of said stream;
means for electrically connecting the conductor of said wire to a ground potential; and
means for detecting an electrical current flowing through said conductor from said stream.

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## 4,517,511
## CURRENT PROBE SIGNAL PROCESSING CIRCUIT EMPLOYING SAMPLE AND HOLD TECHNIQUE TO LOCATE CIRCUIT FAULTS

Anthony J. Suto, Clifton Park, N.Y., assignor to Fairchild Camera And Instrument Corporation, Clifton Park, N.Y.

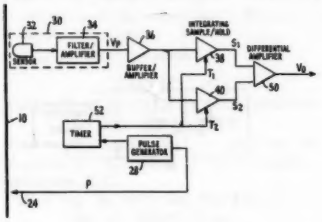
Continuation of Ser. No. 312,158, Oct. 16, 1981, abandoned.
This application Jul. 13, 1984, Ser. No. 610,347
Int. Cl.³ G01R 31/08, 31/28
U.S. Cl. 324—52 18 Claims

1. Apparatus for locating a fault within an electrical circuit comprising:
a pulse generator for applying electrical stimulus pulses to a current carrying conductor;

means for electrically connecting said pulse generator to the conductor;

a current responsive detector for producing an output signal related to the current flowing in said conductor;

means including a first and a second sample and hold circuit for processing said output signal to determine at least one parameter of the current flowing in said conductor; and




synchronizing means for actuating said first sample and hold circuit to sample said output signal during each of said stimulus pulses and for actuating said second sample and hold circuit to sample said output signal after termination of each of said stimulus pulses to thereby synchronize said processing means with said pulse generator.

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**4,517,512**

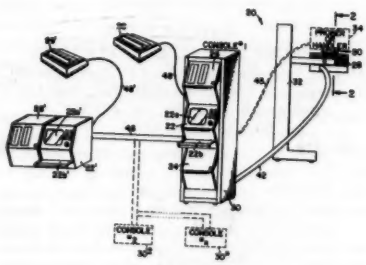
**INTEGRATED CIRCUIT TEST APPARATUS TEST HEAD**

**Dennis M. Petrich, Minnetonka; Christopher G. Amick, Mahtomedi, and Stanley L. Gruenenwald, Blaine, all of Minn., assignors to Micro Component Technology, Inc., Shoreview, Minn.**

**Filed May 24, 1982, Ser. No. 381,736**

**Int. Cl.³ G01R** *31/28, 1/04, 15/12*

**U.S. Cl. 324—73 R** **43 Claims**



1. An automated test apparatus for testing various parameters of multiple-terminal integrated circuit devices at a test station by communicating with the terminals of a device via high-integrity test signals, each involving communication with a single terminal of the device, and via shared function signals, involving communication with all terminals of the device, comprising:

(a) A test head module, comprising:

(i) a chassis, sized and configured for ease of placement and use at a test station, having a test port configured for placement in direct proximity to the terminals of an integrated circuit device to be tested;

(ii) a plurality of discrete circuits mounted in said chassis proximate said test port, each of said circuits being responsive to received control signals and including means for generating and transmitting, and receiving high-integrity test signals communicated to and from, respectively, a corresponding terminal of the device at the test station to which said circuit is dedicated, each of said circuits being uniquely identifiable with, and having a signal output for, a different one of the terminals of the device;

(iii) at least one common circuit electronically communicating with each of said discrete circuits, said at least one common circuit being responsive to received control signals and including means for generating and transmitting, and receiving shared function signals communicated to and from, respectively, all terminals of the device via said discrete circuits;

(iv) means for operatively connecting said plurality of discrete circuits at said test port with said corresponding terminals of said integrated circuit device;

(b) controller means for producing said control signals to selectively activate said discrete circuits and said at least one common circuit, said controller means being operable to produce said control signals in a manner enabling simultaneous activation of a plurality of said discrete circuits and said at least one common circuit; and

(c) means operatively connecting said controller means with said plurality of discrete circuits and said at least one common circuit for carrying said control signals therebetween.

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**4,517,513**

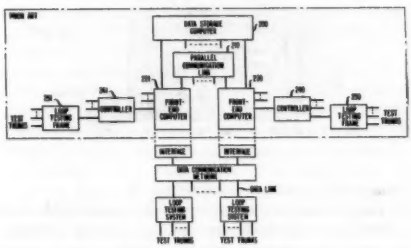
**MAGNETIC DIFFERENTIAL CURRENT SENSOR**

**James M. Brown, Chatham, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Jul. 16, 1982, Ser. No. 399,173**

**Int. Cl.³ G01R** *19/00, 1/02;* **H04M** *3/26*

**U.S. Cl. 324—117 R** **4 Claims**



1. Circuitry (**3300,3400**) for measuring, over a predetermined frequency band (e.g., DC-3200 Hz), current ($I_L$) supplied by a source (**3200**) to the input port (e.g., TIP) of a network (e.g., **180**), said circuitry comprising

a pair of substantially identical cores (e.g., **3307,3308**), each having line ($L_1$,$L_2$), sense ($S_1$,$S_2$) and control ($C_1$,$C_2$) windings,

said control windings being supplied with pulses ($I_C$) to produce magnetic fields of opposing orientations in said cores,

said sense windings, during periods of said pulses, being supplied with a sense signal ($I_S$) to produce magnetic intensities aiding one and opposing the other of said fields, and during intervals between said pulses, being connected to means (**34021,34024**) for cumulatively integrating the induced voltage to produce said sense signal, said cumulative voltage being proportional to said current after a preselected time period,

said line windings being connected in series with said source

and each is arranged to produce a field strength to oppose the corresponding one of said intensities,

buffer circuit means (e.g., **3309,3310,3312**), serially connected with said line windings and said input port, for providing a low impedance relative to said input impedance over said band and a high impedance relative to said input impedance at the rate (e.g., 50 kHz) of said pulses,

means (**3311,3309,3310,34025,34026**), coupled to said sense windings and said buffer means and responsive to said cumulative voltage, for selectively operating said circuitry in a calibrate mode wherein said cumulative voltage is minimized, and

means (**3311**), coupled to said line windings, for routing said current in one direction through said line windings to produce a first measure of said cumulative voltage and for reversing said current direction to obtain a second measure of said cumulative voltage, wherein said current is proportional to said first measure less said second measure.

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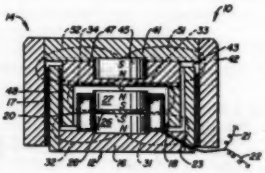
**4,517,514**

## VIBRATION TRANSDUCER WITH DUAL OPPOSED MAGNETIC ASSEMBLIES AND COUNTERBALANCED MASS

**Edward B. Howell, Carmel, Calif., assignor to Design Professionals Financial Corporation, Monterey, Calif.**

**Filed Sep. 30, 1982, Ser. No. 429,640**
**Int. Cl.**[3] **G01B** *7/14;* **G01R** *33/038;* **G01H** *11/00;* **H04R** *11/00*
**U.S. Cl. 324—207** **8 Claims**



1. A magnetic transducer comprising:

a first magnet assembly including a first magnetizable housing having a bottom and upstanding sidewalls defining a first upwardly opening interior volume with a central body axis normal to said bottom, a pair of magnetic field generating means secured within said first volume with the opposite poles of each field generating means aligned along said axis, a like polarity pole of each said pair being arranged in confronting relation, and coil means secured in said interior volume in flux cutting relationship with the magnetic fields generated by said pair; and

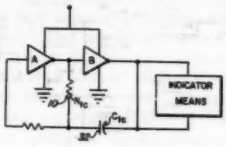
a second magnetic assembly arranged above said first magnetic assembly, said second magnetic assembly including a second magnetizable housing having a top and downwardly depending sidewalls partially surrounding the sidewalls of said first housing, an additional magnetic field generating means secured to the inner surface of said top, the facing poles of said additional magnetic field generating means and the proximate one of said pair of magnetic field generating means having the same polarity so that said first and second magnetic assemblies are mutually magnetically repelled with mutual motion therebetween being confined by said sidewalls to motion substantially along said axis, and a mass secured to said second housing for providing a force of sufficient magnitude to counteract the magnetic force of repulsion between said first and second magnetic assemblies.

**4,517,515**

## MAGNETOMETER WITH A SOLID-STATE MAGNETIC-FIELD SENSING MEANS

**Karl Reinitz, Arnold, and Lynn Hart, Columbia, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jun. 3, 1981, Ser. No. 270,035**
**Int. Cl.**[3] **G01R** *33/02*
**U.S. Cl. 324—252** **3 Claims**




1. Apparatus for detecting a magnetic field comprising:

magnetic sensing means consisting of a solid-state material having the property that its magnetic permeability is a function of the strength of any magnetic field which penetrates the material, and its skin depth and therefore its resistance are functions of its permeability, said solid-state material having a maximum permeability of about 750,000 and a steep hysteresis loop;

signal-producing means, connected to said magnetic field sensing means, said signal-producing means comprising a multivibrator oscillator wherein said magnetic-field sensing means and a capacitor forms an RC-time-constant circuit of said oscillator, whereby a change in resistance of the sensing means changes the frequency of oscillation of said oscillator; and

indicator means, connected to said signal-producing means, for providing an indication of the existence of an output signal therefrom.

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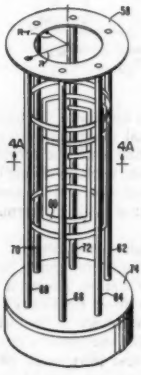
**4,517,516**

## NMR PROBE COIL FORM STRUCTURE

**Howard D. Hill, Cupertino, and Albert P. Zens, Fremont, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.**

**Filed Apr. 8, 1983, Ser. No. 483,351**
**Int. Cl.**[3] **G01R** *33/08*
**U.S. Cl. 324—318** **5 Claims**



1. An RF probe for a spun sample gyromagnetic spectrometer comprising:

(a) sample containment means for holding a sample for analysis,

(b) sample spinning means for rapidly rotating said sample containment means about a rotation axis,

(c) RF saddle coil means surrounding said sample containment means for exciting and detecting gyromagnetic resonance in said sample,

(d) RF coil support means for supporting said RF coil in axial alignment with said rotation axis and spaced from said axis, said support means having at least one axially aligned slot in the lateral wall thereof, the axial length of said slot extending along substantially the axial length of said RF saddle coil means.

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**4,517,517**

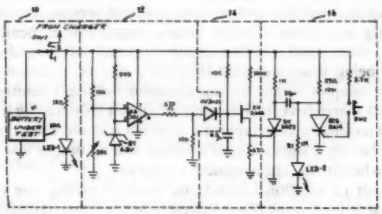
## NICKEL-CADMIUM BATTERY CONDITIONER AND TESTER APPARATUS

**Daniel C. Kinney, Springvale, Me., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 30, 1982, Ser. No. 431,434**

**Int. Cl.³ G01N** *27/46*

**U.S. Cl. 324—433** **2 Claims**



1. A nickel-cadmium battery conditioner and test apparatus comprising in combination:

a battery under test means to receive a battery,

a means for comparing voltage connected to said battery, said comparing means comparing the terminal voltage of said battery with a reference voltage, said comparing means providing a high output signal when said terminal voltage is high than said reference voltage, said comparing means providing a low output signal when said terminal voltage is lower than said reference voltage,

a means for oscillating connected to said comparing means to receive an output signal therefrom, said oscillating means operating in a quiescent state when said high output signal is received from said comparing means, said oscillating means going into oscillation when said low output signal is received from said comparing means, said oscillating means providing a pulsed output signal; and

a switching means connected to said oscillating means, said switching means including a first switch to initiate the discharge cycle of said battery through a discharge circuit, said switching means including a visual indicator means to indicate that said discharge cycle is in progress, said switching means receiving said pulsed output signal from said oscillating means when the terminal voltage of said battery is reached, said switching means terminating said discharge cycle and providing an indication that said terminal voltage has been reached, said switching means comprise a first and second SCR diode, said first SCR diode receiving the pulsed output signal from said oscillating means at its input gate, said second SCR diode in series with a resistor forms said discharge circuit, one end of said resistor is connected directly to said battery, the other end of said resistor being connected to the anode of said second SCR diode, the cathode of said second SCR diode being connected to ground, the gate of said second SCR diode being connected to said first switch, the anode of said first SCR diode being connected to said second SCR diode anode by a capacitor, said first SCR diode responding to said pulsed output signal by turning said second SCR diode off thereby terminating the discharge cycle of said battery.

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**4,517,518**

## CIRCUIT ARRANGEMENT FOR RECONSTRUCTING NOISE-AFFECTED SIGNALS

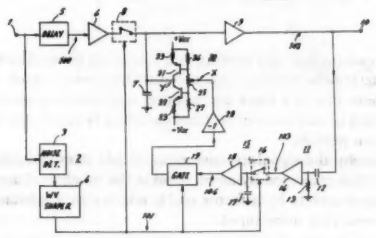
**Yukinobu Ishigaki, Tokyo, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Jul. 29, 1983, Ser. No. 517,985**

**Claims priority, application Japan, Jul. 30, 1982, 57-133298; Jul. 30, 1982, 57-133299; Sep. 8, 1982, 57-155237; Sep. 10, 1982, 57-157751**

**Int. Cl.³ H03B** *1/04*

**U.S. Cl. 328—165** **12 Claims**



1. A circuit arrangement for reconstructing a noise-affected portion of an analog signal having an input terminal to which said analog signal is applied and an output terminal to which a reconstructed signal is delivered, comprising:

means coupled to said input terminal for generating a sampling pulse in response to an impulse noise introduced into said analog signal;

a buffer amplifier coupled to said input terminal;

a first sample-and-hold circuit coupled between the output of said buffer amplifier and said output terminal, said circuit having a capacitor and switching means for applying said analog signal to said capacitor to develop therein a voltage which keeps track of the waveform of said analog signal in the absence of said sampling pulse and holding said voltage in response to said sampling pulse;

a differentiator coupled in a feedback loop from the output of said first sample-and-hold circuit for generating a signal representative of the slope ratio of said analog signal;

a second sample-and-hold circuit in said feedback loop for sampling and holding said slope ratio signal in response to said sampling pulse; and

means in said feedback loop for providing constant current charging and discharging of said capacitor in response to an output signal from said second sample-and-hold circuit.

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**4,517,519**

## FSK DEMODULATOR EMPLOYING A SWITCHED CAPACITOR FILTER AND PERIOD COUNTERS

**Fumiaki Mukaiyama, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan**

**Filed Nov. 5, 1981, Ser. No. 318,496**

**Claims priority, application Japan, Nov. 7, 1980, 55-157193; Mar. 16, 1981, 56-37602**

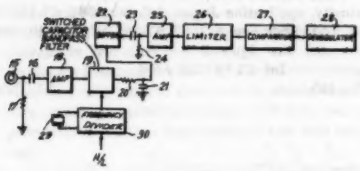
**Int. Cl.³ H03D** *3/00;* **H04L** *27/14*

**U.S. Cl. 329—126** **7 Claims**

1. In an FSK demodulation circuit including a zero-cross detection circuit to demodulate a received binary signal, said binary signal being produced by frequency shift keying techniques whereby marks and spaces are transmitted at different selected frequencies, the improvement comprising:

a signal period counter, said signal period counter including a plurality N of counter sections;

a counter section selector circuit, said selector circuit selecting said counter sections in sequence for reading out a count at every detected zero-cross of said received binary signal, said selector circuit selecting said counter sections in sequence for resetting each of said counter sections, counting pulses from a clock and holding the count accumulated in each of said counter sections between said




resetting and said reading out, said count being detected to determine whether said received frequency signal represents one of a mark and a space, said counting period for each of said counter sections equalling N zero-cross detection periods,

whereby the signal-to-noise ratio of said demodulation circuit is enhanced by an increase in the number of accumulated counts by a factor of N, relative to a substantially unvarying noise input.

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**4,517,520**

**CIRCUIT FOR CONVERTING A STAIRCASE WAVEFORM INTO A SMOOTHED ANALOG SIGNAL**

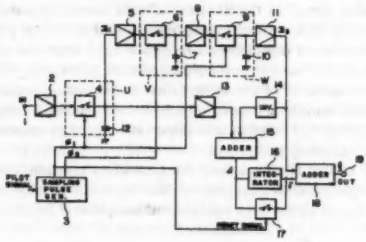
**Atsushi Ogawa, Tokyo, Japan, assignor to Trio Kabushiki Kaisha, Japan**

**Filed Aug. 12, 1982, Ser. No. 407,601**

**Claims priority, application Japan, Aug. 24, 1981, 56-132422; Aug. 24, 1981, 56-132423**

**Int. Cl.³ H03K *5/00***

**U.S. Cl. 329—145** **4 Claims**




1. A circuit for converting an input staircase waveform signal (e.g., $\Sigma_1$) with a regular stepping time interval but different stepping heights into a smoothed analog signal (e.g., $\epsilon$) comprising:

a delay unit for delaying said input staircase signal for one said stepping interval,

means for producing a differential signal (e.g., $\Delta$) by taking the difference between said input staircase signal and said one stepping interval delayed version (e.g., $\Sigma_3$) thereof,

means for integrating said differential signal with respect to time at every stepping interval to produce a sawtoothwave signal (e.g., $\gamma$) with substantially linear slopes, and

means for additively combining said sawtoothwave signal with said one stepping interval delayed version.

**4,517,521**

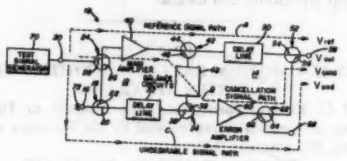
**FEED FORWARD CIRCUIT AND A METHOD FOR ALIGNING AND BALANCING THE SAME**

**Joseph P. Preschutti, State College, and John C. Pavlic, Pleasant Gap, both of Pa., assignors to C-COR Electronics, Inc., State College, Pa.**

**Filed Feb. 28, 1984, Ser. No. 584,494**

**Int. Cl.³ H03F *1/32***

**U.S. Cl. 330—2** **8 Claims**




1. An improved feed forward circuit, said feed forward circuit including a first circuit loop to isolate signal noise and distortion and a second circuit loop to reduce signal noise and distortion, said first circuit loop and said second circuit loop having directional coupler means, amplification means, and delay means, and said first circuit loop and said second circuit loop being interconnected through a pair of common directional coupler means having common balance circuitry connected therebetween, and said first circuit loop having a signal input terminal and an input test terminal and said second circuit loop having a signal output terminal and an output test terminal, wherein the improvement comprises,

a pair of additional directional coupler means, one of said additional directional coupler means being connected in circuit relationship with said first circuit loop and said input test terminal and the other of said additional directional coupler means being connected in circuit relationship with said second circuit loop and said output test terminal, said additional directional coupler means being operable to promote accurate alignment and balance of said feed forward circuit and improve gain flatness and reduce signal distortion during operation thereof.

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**4,517,522**

**SWITCHING AMPLIFIER**

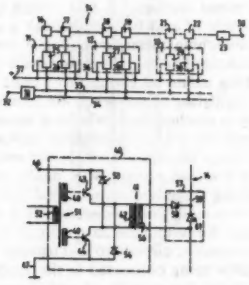
**Andreas Furrer, Turgi, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland**

**Filed Jun. 6, 1983, Ser. No. 501,179**

**Claims priority, application Switzerland, Jun. 25, 1982, 3920/82**

**Int. Cl.³ H03F *3/38***

**U.S. Cl. 330—10** **6 Claims**



1. A high power switching amplifier comprising:

a signal converter which converts an input signal to be amplified into at least two pulse sequences;

a plurality of amplifier stages, each of said amplifier stages comprising at least one switching stage for amplifying a respective pulse sequence;

each of said switching stages comprising at least one switching element and a transformer having a primary winding connected to a supply-voltage source by means of said at least one switching element, said at least one switching element controlled by one of said two pulse sequences, and said transformer having a secondary winding connected in series with the secondary windings of the other switching stage transformers;

a low-pass filter connected to said series circuit for converting the pulse sequences amplified in said switching stages into an amplified output signal;

wherein each of said transformers comprises a toroidal core of low remanence material, each said secondary winding comprising plural turns of rf stranded wire wound on a respective toroidal core, an insulating housing provided around said secondary winding, said primary winding disposed on said insulating housing and comprising plural turns of rf stranded wire, an outer housing confining said transformer and being filled with an insulating material, and a metallic mandrel within a bore of said toroidal core.

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**4,517,523**

## OSCILLOSCOPE TRIGGER CIRCUIT COMBINING WIDEBAND TRIGGER SIGNAL AMPLIFICATION AND TRIGGER COUPLING MODE SELECTION

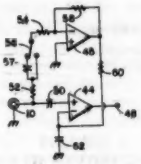
**Frank Miles, Ann Arbor, Mich., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Oct. 3, 1983, Ser. No. 538,244**

**Claims priority, application Japan, Oct. 22, 1982, 57-184779**

**Int. Cl.³ H03F *3/68***

**U.S. Cl. 330—126** **1 Claim**



1. A wideband trigger circuit for an oscilloscope, comprising:

an input terminal for receiving an input signal;

an input impedance network including at least one DC signal path connected to said input terminal for providing a plurality of selectable input signal coupling modes;

a low frequency amplifier coupled to said impedance network for amplifying low frequency components of said input signal;

a high frequency amplifier having a first input AC coupled to said input terminal and a second input coupled to the output of said low frequency amplifier for amplifying high frequency components of said input signal and for adding the low and high frequency components; and

means for selecting any one of said plurality of selectable input signal coupling modes thereby to establish the frequency response of said trigger circuit.

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**4,517,524**

## HIGH FREQUENCY OPERATIONAL AMPLIFIER

**William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 1, 1983, Ser. No. 510,019**

**Int. Cl.³ H03F *3/45***

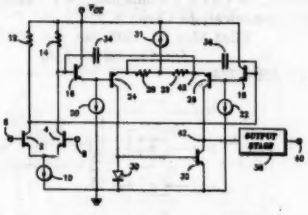
**U.S. Cl. 330—257** **10 Claims**

1. A differential amplifier, comprising:

first and second input means responsive to first and second input signals;

first and second switching means coupled to said first and second input means respectively and responsive thereto;

current mirror means coupled to said first and second switching means and cooperating therewith to provide an output signal, said first and second switching means comprising: first and second transistors each having a base electrode coupled to said first and second input means respectively, a collector electrode coupled to said current mirror means and each having an emitter; impedance



means coupled between the emitters of said first and second transistors; and a first current source coupled to the emitters of said first and second transistors for supplying current thereto;

first capacitive transfer means coupled between the input of said first input means and the emitter of said second transistor for transferring signal to said second switching means to speed the operation thereof; and

second capacitive transfer means coupled between the input of said second input means and the emitter of said first transistor for transferring signal to said first switching means to speed the operation thereof.

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**4,517,525**

## BALANCING COMPENSATION IN DIFFERENTIAL AMPLIFIERS WITH A SINGLE-ENDED DRIVE

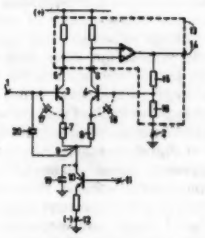
**Else C. Dijkmans, and Rudy J. van de Plassche, both of Groenewoudseweg 1, Eindhoven, Netherlands**

**Filed Nov. 29, 1982, Ser. No. 445,334**

**Claims priority, application Netherlands, Dec. 9, 1981, 8105536**

**Int. Cl.³ H03F *1/14, 3/45***

**U.S. Cl. 330—260** **8 Claims**



1. A differential amplifier comprising

a first input adapted to receive an input signal and a second input coupled to a first point of constant potential,

a first output and a second output for supplying two output signals which are in phase-opposition and depend on the input signal,

a first transistor having a control electrode, a first main electrode and a second main electrode coupled to the first input, the first output and to a common point respectively,

a second transistor having a control electrode, a first main electrode and a second main electrode coupled to the second input, the second output and to the common point respectively, and

a third transistor arranged as a current source and having a first main electrode coupled to the common point and a second main electrode coupled to a second point of constant potential, and a balancing impedance which comprises at least a capacitor coupled between the control electrode of the first transistor and the common point.

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**4,517,526**

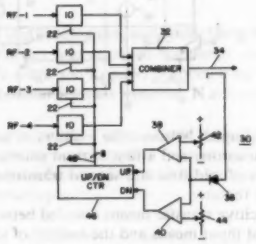
## DIGITALLY CONTROLLED AGC AMPLIFIER

**Thomas A. Di Cicco, Farmingdale, N.Y., assignor to Comtech Telecommunications Corp., N.Y.**

**Filed May 25, 1983, Ser. No. 498,087**

**Int. Cl.³ H03G *3/30***

**U.S. Cl. 330—284** **20 Claims**




1. In a predetection combining system, responsive to a plurality of component signals in component signal channels, for combining said signals to form a composite output signal representative of the vector sum of said component signals, said system including means for providing automatic gain control of said component signals responsive to the signal level of said composite signals, the improvement wherein said means for providing automatic gain control includes:

means, responsive to said composite signal, for providing a first digital signal representative of a desired attenuation within a selected attenuation range, said first digital signal having at least a number of bits N selected to cause said first digital signal to have a number of values at least as great as the number of selected minimum attenuation steps in said attenuation range;

means in each of said component signal channels for attenuating said component signals, each of said attenuation means responsive to a corresponding applied analog attenuation control voltage, each of said voltages having a range of voltage values to cause said attenuation devices to provide attenuation over said selected attenuation range with a predetermined relation of attenuation to each of said voltage values, there being a minimum value of voltage change for each of said voltages corresponding to one of said minimum attenuation steps;

a plurality of digital-to-analog converters, one for each of said component signal channels, for providing analog attenuation control voltages with said ranges of voltage values, each of said converters responsive to a respective second digital signal, said second digital signal having at least M bits, the value M being selected to provide a number of second digital signal values that is at least as great as the ratio of said range of voltage values for said voltages to said minimum value of voltage change; and

a plurality of programmed digital memory means, one for each of said component signal channels, each having at least N addresses of at least M bits, and each responsive to said first digital signal for providing said second digital signals to one of said digital to analog converters, said memory means being programmed to provide second digital signals which cause said digital to analog converters to provide said control voltages to said attenuation devices and cause equal increments of attenuation for equal changes of said first digital signal.

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**4,517,527**

## WAVEGUIDE AMPLIFIER CIRCUIT

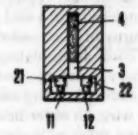
**Shigenobu Aihara, and Akio Yamada, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Apr. 12, 1983, Ser. No. 484,162**

**Claims priority, application Japan, Apr. 15, 1982, 57-62866**

**Int. Cl.³ H03F *3/60***

**U.S. Cl. 330—287** **4 Claims**




1. A waveguide reflection amplifier circuit comprising:

a waveguide circuit reflecting and amplifying an input electromagnetic wave, and having two semiconductor amplifier elements of the same electrical characteristics which are arranged on the same plane perpendicular to a propagation direction of said input electromagnetic wave;

an additional waveguide circuit arranged at the center between said semiconductor amplifier elements and extending in a direction which is perpendicular to a direction along a line connecting said semiconductor amplifier elements and to the electromagnetic wave propagation direction; and

a termination circuit arranged at an end, remote from said semiconductor amplifier elements, of said additional waveguide circuit.

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**4,517,528**

## AMPLIFIER CIRCUIT DRIVEN BY GROUND ISOLATED POWER SUPPLY

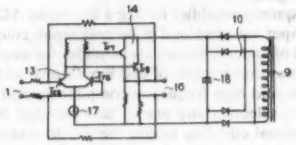
**Susumu Tanaka, and Ryosuke Ito, both of Tokyo, Japan, assignors to Sansui Electric Co., Ltd., Tokyo, Japan**

**Filed Oct. 26, 1982, Ser. No. 436,892**

**Claims priority, application Japan, Oct. 31, 1981, 56-162837[U]; Oct. 31, 1981, 56-162833[U]; Aug. 9, 1982, 57-119871[U]**

**Int. Cl.³ H03F *3/04, 3/20***

**U.S. Cl. 330—297** **10 Claims**



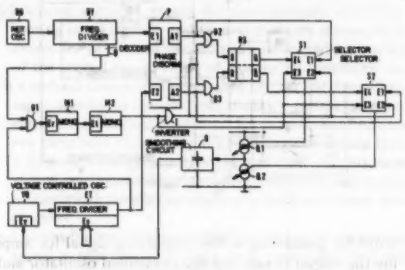

1. An amplifier comprising input means for preamplifying an input signal, output means for power-amplifying at least one output from said input means and haing a two terminal, balanced output circuit, a load connected between said two terminals, and power supply means for feeding electric power for driving said input means and said output means, said power supply means floating from a ground potential.

4,517,529

## DIGITAL PHASE/FREQUENCY CONTROL CIRCUIT

Guenter Lindstedt, Freiburg, and Guido H. Nopper, Umkirch, both of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed Nov. 16, 1982, Ser. No. 442,056
Claims priority, application European Pat. Off., Dec. 10, 1981, 81110300.1
Int. Cl.³ H03L 7/08
U.S. Cl. 331—1 A 3 Claims




1. A digital phase control circuit wherein the output signal of a voltage-controlled oscillator (VO) which includes a varactor diode and whose frequency can be varied by a phase discriminator (P) is applied to the second input (E2) of the phase discriminator (P) through a presettable frequency divider (ET) serving to select the frequency of the oscillator, wherein the signal of a reference oscillator (RO) is applied to the first input (E1) of the phase discriminator (P) through a reference-frequency divider (RT), and wherein the phase discriminator has a first output (A1) for pulses raising the frequency of the oscillator and a second output (A2) for pulses lowering the frequency of the oscillator (VO), *characterized by the following features:*

A range of successive counts of the reference-frequency divider (RT) is monitored by means of a decoder (D) for forming a time window;

the output of the decoder is coupled to the first input of a first AND gate (U1) having its second input connected to the output of the presettable frequency divider (ET);

the reset input (Er) of a resettable first digital monostable multivibrator (M1) is connected to the output of the first AND gate (U1);

the trigger input (Et) of a second digital monostable multivibrator (M2) is connected to the output of the first monostable multivibrator (M1);

the S and R inputs of an RS flip-flop (RS) are connected to the outputs of a second AND gate (U2) and a third AND gate (U3), respectively, to whose first inputs the output signal of the second monostable multivibrator (M2) is applied through an inverter (I);

the second inputs of the second AND gate (U2) and the third AND gate (U3) are connected to the first output (A1) and the second output (A2), respectively, of the phase discriminator (P);

the first and second outputs of the phase discriminator are coupled to the first inputs (E1) of a first control signal selection circuit (S1) and a second control signal selection circuit (S2), respectively, to whose second inputs (E2) the output signal of the second monostable multivibrator (M2) is applied through the inverter (I), and whose third inputs (E3) are fed with the output signal of the second monostable multivibrator (M2) direct, while their fourth inputs (E4) are connected to the Q output and the $\overline{Q}$ output, respectively, of the RS flip-flop (RS);

the output of the first control signal selection cicuit (S1) is coupled to the control input of a first constant-current source (Q1) whose current charges a smoothing device (G), and the output of the second control signal selection circuit (S2) is coupled to the control input of a second constant-current source (Q2) which discharges the smoothing device, and

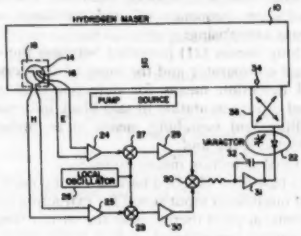
the output of the smoothing device is coupled to the control input (Ev) of the voltage-controlled oscillator (VO).

4,517,530

## MASER CAVITY SERVO-TUNING SYSTEM

Richard L. Sydnor, Altadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, DC

Filed Nov. 30, 1983, Ser. No. 556,513
Int. Cl.³ H03L 7/26; H01P 7/06
U.S. Cl. 331—3 11 Claims




1. A method for servo tuning a finite Q cavity to stabilize its resonance frequency comprising the steps of

detecting the phase difference between the magnetic and the electric fields in the cavity, and

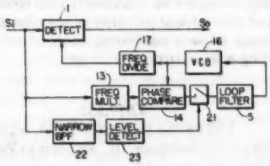
in response to the detected phase difference, changing the reactance inside said cavity to correct any drift in resonance frequency.

4,517,531

## CARRIER WAVE REPRODUCING CIRCUIT IN SYNCHRONIZED DETECTION SYSTEM OF MEDIUM SPEED FACSIMILE

Yoichi Tan, and Fumio Miyao, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 5, 1982, Ser. No. 337,190
Claims priority, application Japan, Jan. 9, 1981, 56-1901
Int. Cl.³ H03L 7/08; H03D 3/00; H04N 1/40
U.S. Cl. 331—14 8 Claims




1. In a signal demodulator circuit for demodulating a modulated input signal containing black information and white information, said demodulator of the type including a synchronized detector for receiving said modulated input signal and detecting said modulated input signal, a carrier reproducing circuit for generating a reproduced carrier from said modulated input signal and applying said reproduced carrier to said synchronized detector, said modulated input signal including signal portions representing said black information and signal portions representing said white information, the improvement characterized in that: said carrier reproducing circuit includes

a phase synchronizing loop connected to receive said modulated input signal for providing said reproduced carrier to said synchronized detector; and

disabling means for disabling a phase locking of said phase synchronizing loop in response to a predetermined level of representation of said black information, said loop continues to provide an output even when not phase locked; and said phase synchronizing loop comprises:

a voltage controlled oscillator (6), a phase comparator (14) whose inputs are connected to receive said modulated input signal and to receive the output signal of said voltage controlled oscillator, and a loop filter (5) whose input is connected to the output of said phase comparator and whose output is connected to the control terminal of said voltage controlled oscillator through which the output signal of said comparator is applied to the control terminal of said voltage controlled oscillator for controlling the oscillation frequency of said oscillator, said disabling means comprising:

switching means (21) provided between the output of said phase comparator and the input of said loop filter; and

signal detection means for detecting said predetermined level of representation of said black information and controlling said switching means in accordance with said detected level; and

said signal detection means comprises:

a band-pass filter (22) of a narrow band connected to receive said modulated input signal for extracting frequency components applied thereto near the carrier frequency of said modulated input signal; and

a level detector (23) for controlling said switching means based on said level derived from the output signal of said band-pass filter.

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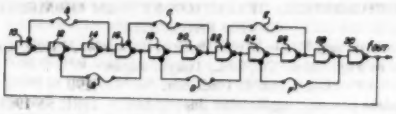
**4,517,532**

## PROGRAMMABLE RING OSCILLATOR

**Robert A. Neidorff, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 1, 1983, Ser. No. 510,049**
**Int. Cl.³ H03K** *3/03*
**U.S. Cl. 331—57** **8 Claims**



1. A programmable ring oscillator comprising:

a plurality of series coupled inverter gates; and

a plurality of bypass means coupled between the outputs of selected ones of said plurality of inverter gates to alter the frequency of said oscillator, each of said bypass means including a laser trimmable fuse.

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**4,517,533**

## INTEGRATED CRYSTAL VCO

**Wayne E. Bretl, Schaumburg, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Oct. 26, 1983, Ser. No. 545,803**
**Int. Cl.³ H03B** *5/00*
**U.S. Cl. 331—116 R** **13 Claims**

1. An integrated voltage controlled oscillator coupled to a variable control voltage source for changing the frequency of oscillation thereof and coupled to a crystal network, said voltage controlled oscillator comprising:

first and second terminals coupled to said crystal network;

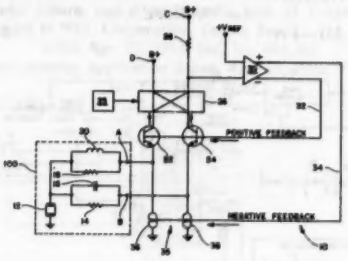
first and second conducting means respectively coupled to said first and second terminals;

a current source coupled to said first and second terminals and to said first and second conducting means;

a current steering network coupled to said control voltage source and to said first and second conducting means for alternately directing a signal through said first and second conducting means in establishing the oscillating frequency of said voltage controlled oscillator;

a positive feedback path coupled between said first and second conducting means and said current steering network for generating a first amplifying signal for amplifying the output of said voltage controlled oscillator and for establishing the oscillation thereof; and

a negative feedback path coupled between said current source and said current steering network for generating a second stabilizing signal for stabilizing the thus amplified output of said voltage controlled oscillator.

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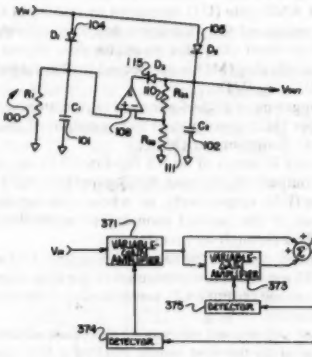
**4,517,534**

## CIRCUIT DETECTOR AND NOISE REDUCTION NETWORK WITH CIRCUIT DETECTOR

**Stephen F. Smith, Knoxville, Tenn., assignor to Alpha-Omega Engineering, Inc., Knoxville, Tenn.**

**Filed Jul. 11, 1983, Ser. No. 512,869**
**Int. Cl.³ H04B** *1/64;* **H03G** *7/00;* **H03K** *5/153*
**U.S. Cl. 333—14** **24 Claims**



24. A compander circuit for compressing and expanding the dynamic range of an electrical intelligence signal comprising:

(a) first variable gain amplifier responsive to a first control signal, said first variable gain amplifier having a compressor input point for receiving an electrical intelligence signal and a compressor circuit output for providing a first primary electrical source signal with a compressed dynamic range;

(b) a first detector responsive to said first primary electrical source signal for providing said first control signal to

control said first variable gain amplifier, said first detector comprising,

(c) first memory means for continuously receiving and storing input signals;

(d) a first directional conducting circuit for providing said input signals to said first memory means, said first directional conducting circuit for receiving said first primary electrical source signal and being connected between said compressor circuit output and said first memory means and comprising a first unidirectional conductor in electrical parallel arrangement with a first resistive element;

(e) second memory means for continuously receiving and storing input signals, said second memory means including means for providing said first control signal representative of the stored signal value of said second memory means;

(f) a second directional conductor circuit for providing said input signals to said second memory means, said second directional conducting circuit for receiving a first secondary electrical source signal and being connected between a first secondary input point and said second memory means, and comprising a second unidirectional conductor in electrical parallel arrangement with a second resistive element;

(g) means for providing said first secondary electrical source signal to said first secondary input point, said first secondary source signal being proportional to said first primary electrical source signal;

(h) an active signal amplifying device and a third unidirectional conductor in electrical series arrangement to provide a dynamically-controlled charge and/or discharge path for said second memory means which is dependent upon the instantaneous voltages on said first and second memory means such that,

for the discharge case, whenever the stored signal value of said first memory means is at least equal to a prescribed fraction of the stored signal value of the second memory means, the amplifying device produces an output signal such that said third unidirectional conductor does not conduct, and thus the stored signal values of said first and second memory means are essentially independent of each other and vary substantially only in response to changes in said input signals provided to said first and second memory means, respectively, as they discharge according to their respective time constants, and whenever said primary electrical source signal is less than the stored value of said second memory means and said stored value of said first memory means decreases to a value substantially equal to the prescribed fraction of the stored value of said second memory means, which value is greater than the stored value of said first memory means, said amplifying device causes said third unidirectional conductor to conduct and the stored signal values of said first and second memory means vary in a nearly proportional manner and remain substantially proportional to each other by the ratio of the said prescribed fraction as they both discharge according to a combined time constant which is essentially the time constant of said first memory means;

and for the charging case, whenever the stored signal value of said first memory means is at most equal to the inverse of a prescribed fraction of the stored signal value of the second memory means, the amplifying device produces an output signal such that said third unidirectional conductor is now reversed in orientation from the discharge case and does not conduct, and thus the stored signal values of said first and second memory means are essentially independent of each other and vary substantially only in response to changes in said input signals provided to said first and second memory means, respectively, as they charge or discharge according to the level of their said input signals and their respective time constants, and whenever said primary electrical source signal is greater than the stored value of said second memory means and said stored signal value of said first memory means increases to a value substantially equal to the inverse of the prescribed fraction of the stored value of said second memory means which value is now less than the stored value of said first memory means by the ratio of the prescribed fraction, said amplifying device causes said third unidirectional conductor to conduct and the stored signal values of said first and second memory means vary in a nearly proportional manner and remain substantially proportional to each other by the ratio of the said prescribed fraction as they both charge according to a combined time constant which is essentially the time constant of said first memory means;

(i) a second variable gain amplifier responsive to a second control signal, said second variable gain amplifier having an expander input point for receiving said first primary electrical source signal and an expander circuit output for providing a second primary electrical source signal with an expanded dynamic range;

(j) a second detector responsive to said first primary electrical source signal for providing said second control signal to control said second variable gain amplifier, said second detector comprising:

(k) third memory means for continuously receiving and storing input signals;

(l) a third directional conducting circuit for providing said input signals to said third memory means, said third directional conducting circuit for receiving said first primary electrical source signal and being connected between said expander circuit input and said third memory means and comprising a fourth unidirectional conductor in electrical parallel arrangement with a third resistive element, fourth memory means for continuously receiving and storing input signals, said fourth memory means including means for providing said second control signal representative of the stored signal value of said fourth memory means;

(m) a fourth directional conductor circuit for providing said input signals to said fourth memory means, said fourth directional conducting circuit for receiving a second secondary electrical source signal and being connected between a second secondary input point and said second memory means, and comprising a fifth unidirectional conductor in electrical parallel arrangement with a fourth resistive element;

(n) means for providing said second secondary electrical source signal to said second secondary input point, said second secondary source signal being proportional to said first primary electrical source signal; and,

(o) an active signal amplifying device and a sixth unidirectional conductor in electrical series arrangement to provide a dynamically-controlled charge and/or discharge path for said fourth memory means which is dependent upon the instantaneous voltages on said third and fourth memory means such that,

for the discharge case, whenever the stored signal value of said third memory means is at least equal to a prescribed fraction of the stored signal value of the fourth memory means, the amplifying device produces an output signal such that said sixth unidirectional conductor does not conduct, and thus the stored signal values of said third and fourth memory means are essentially independent of each other and vary substantially only in response to changes in said input signals provided to said third and fourth memory means, respectively, as they discharge according to their respective time constants, and whenever said primary electrical source signal is less than the stored value of said fourth memory means and said stored value of said third memory means decreases to a value substantially equal to the prescribed fraction of the stored value of said fourth memory means, which value is greater than the stored value of said third memory means, said amplifying device causes said sixth unidirectional conductor to conduct and the stored signal values of said third and fourth memory means vary in a nearly proportional manner and remain substantially proportional to each other by the ratio of the said prescribed fraction as they both discharge

according to a combined time constant which is essentially the time constant of said third memory means;

and for the charging case, whenever the stored signal value of said third memory means is at most equal to the inverse of a prescribed fraction of the stored signal value of the fourth memory means, the amplifying device produces an output signal such that said sixth unidirectional conductor is now reversed in orientation from the discharge case and does not conduct, and thus the stored signal values of said third and fourth memory means are essentially independent of each other and vary substantially only in response to changes in said input signals provided to said third and fourth memory means, respectively, as they charge or discharge according to the level of their said input signals and their respective time constants, and whenever said primary electrical source signal is greater than the stored value of said fourth memory means and said stored signal value of said third memory means increases to a value substantially equal to the inverse of the prescribed fraction of the stored value of said fourth memory means which value is now less than the stored value of said third memory means by the ratio of the prescribed fraction, said amplifying device causes said sixth unidirectional conductor to conduct and the stored signal values of said third and fourth memory means vary in a nearly proportional manner and remain substantially proportional to each other by the ratio of the said prescribed fraction as they both charge according to a combined time constant which is essentially the time constant of said third memory means.

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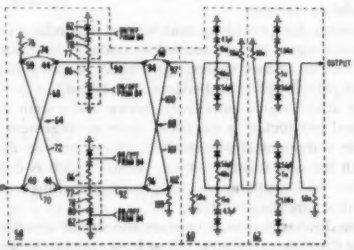
**4,517,535**

## HIGH SPEED HIGH POWER STEP ATTENUATOR METHOD AND APPARATUS

**Chuck Y. Pon, Belmont, Calif., assignor to Dalmo Victor Operations, Bell Aerospace Textron, Div. of Textron, Inc., Belmont, Calif.**

**Filed Jul. 28, 1982, Ser. No. 402,622**
**Int. Cl.³ H01P *1/22***
**U.S. Cl. 333—81 A** **17 Claims**




1. Apparatus for attenuating a high frequency electromagnetic input signal having a predetermined magnitude comprising

means responsive to the input signal for splitting the input signal into a first signal and a second signal, each having a predetermined magnitude the sum of which is substantially equal to the input signal magnitude, the input signal splitting means having an input port for receiving the input signal, a first output port for outputting the first signal, and a second output port for outputting the second signal, the input port being isolated from the first and second output ports such that waveforms reflected from the first and second output ports and back into the input signal splitting means cancel one another at the input port and are additive with one another at a termination port for dissipation there;

mismatch means in communication with the first and second output ports for providing selectably connectable impedance mismatches at substantially the same electrical distance from each output port, wherein the impedance mismatch connected at one output port is substantially equal in magnitude to the impedance mismatch connected at the other output port, so that a portion of the first signal from the first output port and a portion of the second signal from the second output port are reflected back into the input signal splitting means for dissipation therein, and so that the unreflected portion of each of the first and second signals are transmitted; and

means responsive to the transmitted portion of the first signal and to the transmitted portion of the second signal for recombining the transmitted portions so that the recombined signal corresponds to the input signal, the magnitude of which has been attenuated by a quantity determined by the degree of impedance mismatch provided by the mismatch means.

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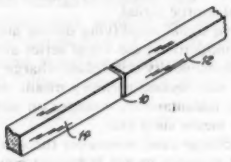
**4,517,536**

## LOW LOSS DIELECTRIC WAVEGUIDE JOINT AND METHOD OF FORMING SAME

**Richard A. Stern, Allenwood, and Richard W. Babbitt, Fair Haven, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sep. 29, 1982, Ser. No. 426,504**
**Int. Cl.³ H01P *1/04*; B65H *69/02***
**U.S. Cl. 333—254** **7 Claims**




1. A low loss joint between millimeter wavelength, dielectric components comprising:

a first longitudinal section of a magnesium titanate dielectric waveguide transmission line having a predetermined cross section,

a second longitudinal section of a magnesium titanate dielectric waveguide transmission line of the same cross section and dielectric material, said first and second sections having respective opposing ends aligned and closely spaced in a transverse butt joint, and a curved mixture of an barium titanate inorganic dielectric and an cellulose nitrate organic binder filling the space between said ends and solidly joining said sections, said mixture having a dielectric constant substantially the same as said two sections and wherein said filled joint provides a 65 percent improvement in insertion loss reduction.

5. A method of fabricating a low loss joint between millimeter wavelength, magnesium titanate dielectric components so that a 65 percent improvement in insertion loss reduction is provided, said method comprising:

preparing a slurry of an barium titanate inorganic dielectric and an cellulose nitrate organic binder;

placing said slurry in the joint between said barium titanate dielectric components; and curing the slurry.

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**4,517,537**

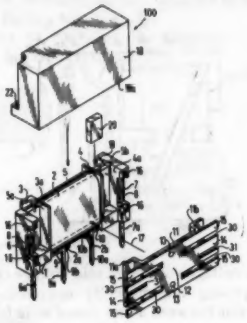
## ELECTROMAGNETIC MINIATURE RELAY AND METHOD OF MANUFACTURE

**Josef Weiser, Hohenschaftlarn; Alfred Heinzl, and Heinz Stadler, both of Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed May 11, 1984, Ser. No. 609,305**
**Claims priority, application Fed. Rep. of Germany, May 20, 1983, 3318493**
**Int. Cl.³ H01H *3/00***
**U.S. Cl. 335—187** **11 Claims**

1. In an electromagnetic miniature relay having a base body

containing a flat core being disposed inside of an excitation coil with ends of the core extending from both ends of the coil to form a pole piece at each end of the core for an armature having ends which armature is disposed next to the coil and is pressed against a spring arrangement to have the ends engage both pole pieces when the coil is energized, the improvements comprising said core being embedded in the base body, at least one stationary contact with a terminal pin being embedded in the base body adjacent each end of the coil and in the area of the armature ends, and a contact spring member being connected to a central portion of the armature and having contact



portions with a length along the length of the armature to extend beyond the ends of the armature to form movable contacts to overlie the stationary contacts, said movable contacts being moved with the armature so that when the coil is denergized, the ends of the armature form air gaps with each of the pole pieces and the movable contacts are spaced from the adjacent stationary contact elements and when the coil is energized the armature moves against the spring arrangement with the armature ends moving into contact with the pole pieces and the movable contacts which are formed by the ends of the contact portions engage the two stationary contacts to form an electric contact therebetween.

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**4,517,538**

## ELECTROMAGNETIC ROTARY ACTUATOR WITH ROCKING MOVEMENT, IN PARTICULAR FOR IMPACT PRINTERS

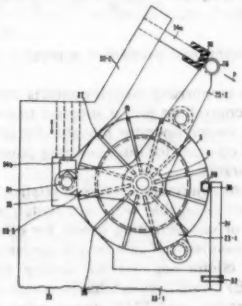
**Armin Bohg, Weil-Neuweiler; Horst D. Matthaei, Waldenbuch, and Kurt Hartmann, Calw Heumaden, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 26, 1983, Ser. No. 545,562**

**Claims priority, application European Pat. Off., Nov. 5, 1982, 82110213.4**

**Int. Cl.³ H01F *7/14***

**U.S. Cl. 335—272** **7 Claims**



1. An electromagnetic actuator comprising an electromagnetic yoke assembly including magnetically permeable means forming at least one magnetizable path including a gap, coil means for selectively magnetizing said path, and armature means including a magnetizable element dimensioned to move into and out of said gap, wherein the improvement comprises:

means supporting said yoke assembly and said armature means for relative movement about an axis of rotation, and

means for restraining relative movement of said yoke assembly and said armature to a small angle of rotation.

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**4,517,539**

## MEGNETIC DEVICE

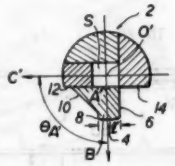
**Yoshio Sakata, Yamato, Japan, assignor to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed May 31, 1983, Ser. No. 499,270**

**Claims priority, application Japan, Jun. 1, 1982, 57-81427[U]**

**Int. Cl.³ H01F *7/02***

**U.S. Cl. 335—302** **10 Claims**



1. A magnetic body defining an axis comprised of at least one magnet, the revolution of said body about its axis defining a cylinder of revolution having a circular cross section, spaced first and second surface portions of the body lying coincident with the periphery of the cylinder of revolution, a pair of parallel surfaces defined by the body extending radially inwardly from opposite ends of said second surface, and surface means lying within the periphery of the cylinder of revolution connecting the radially inner edges of said parallel surfaces with opposite ends of the first surface, said body including at least one magnet at least a portion of which is bounded by said second surface and said parallel surfaces.

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**4,517,540**

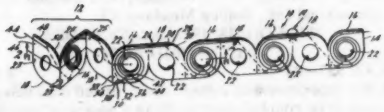
## SPIRAL WINDINGS

**John A. McDougal, 14388 Harbor Island, Detroit, Mich. 48215**

**Continuation of Ser. No. 796,533, May 13, 1977, abandoned. This application Mar. 28, 1980, Ser. No. 135,188**

**Int. Cl.³ H01F *27/30***

**U.S. Cl. 336—205** **19 Claims**



1. A coil construction comprising:

an elongated flexible substrate having a high dielectric strength;

a single continuous electrically-conductive wire having an insulating coating thereon being wound without sever-

ances or splices so as to form a plurality of spaced apart spiral coils on one side of said substrate;

said wire having interconnecting portions extending between said spaced apart spiral coils, said interconnecting portions being disposed, at least in part, on another side of said substrate; and

said substrate having a slit provided therein, said slit extending inwardly from an outer edge portion of said substrate and being operative to allow said wire to pass through said substrate between said one side of said substrate and said another side of said substrate whereby said wire will be spaced inwardly from said edge portion as it extends between said one side and said another side of said substrate.

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**4,517,541**

## SNAP TYPE THERMALLY RESPONSIVE SWITCH DEVICE

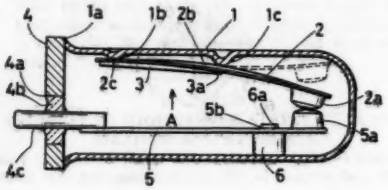
**Susumu Ubukata; Yasukazu Mizutani, and Shozo Iyoda, all of Nagoya, Japan, assignors to Susumu Ubukata, Nagoya, Japan**

**Filed Nov. 9, 1983, Ser. No. 550,182**

**Claims priority, application Japan, Nov. 24, 1982, 57-177393[U]**

**Int. Cl.³ H01H** *61/00, 37/04*

**U.S. Cl. 337—89** **8 Claims**




1. A snap type thermally responsive switch device comprising:

(a) a thermally responsive element having a central dish-shaped portion to induce snap movement, the element being enclosed within a metallic enclosure in a manner to have one end secured to a stationary means so as to act as a support end, and the other end carrying a movable contact in making contact relationship with a fixed contact at the normal temperature which is disposed in said enclosure;

(b) a first projection in the enclosure disposed to always engage the central portion of said dish-shaped portion;

(c) a reinforcer extension having one end secured to said stationary means in the proximity of the support end of said thermally responsive element, and the other end sandwiching the central portion of said dish-shaped area in cooperation with said first projection, the reinforcer extension being adapted to allow said dish-shaped area to slide between said other end and said projection.

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**4,517,542**

## VOLTAGE AND TEMPERATURE COMPENSATED TIME DELAY RELAY

**Hemming G. Silberg, New Providence, N.J., assignor to Edison International Inc., Rolling Meadows, Ill.**

**Filed Oct. 18, 1982, Ser. No. 435,073**

**Int. Cl.³ H01H** *61/06*

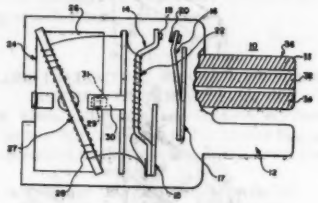
**U.S. Cl. 337—92** **8 Claims**

1. A temperature and voltage compensated time delay relay adapted to be coupled electrically to a source of supply voltage, the magnitude of which is subject to variations, said time delay relay including in combination;

first and second contact carrying bimetallic elements,

electrically operated heating means positioned for heating said first bimetallic element to deflect said element with respect to said second element from a first open contact condition to a second closed contact condition, the time period for deflection of said first bimetallic element being dependent upon the heating time of said electrically operated heating means; and

voltage control circuit means coupled electrically between said heating means and said source of supply voltage for varying the application of voltage from said source to said heating means in accordance with variations in the magnitude of said supply voltage in order to maintain the heating time of said heating means substantially constant de-



spite voltage variations, said voltage control circuit means comprising intermittently operated electrical contacts operable between a first closed state for supplying voltage from said source to said heating means and to a second open state for removing the supply of voltage from said source from said heating means, the time period said voltage control circuit remains in said second open state being constant while the time period said voltage control means remains in said first closed state varies inversely proportionally with an increase in the magnitude of said supply voltage.

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**4,517,543**

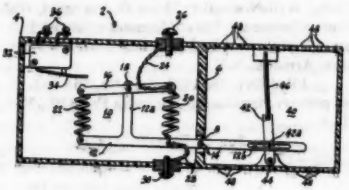
## SME OVERCURRENT PROTECTIVE APPARATUS HAVING AMBIENT TEMPERATURE COMPENSATION

**John R. Brubaker, Milwaukee, Wis., assignor to Eaton Corporation, Cleveland, Ohio**

**Filed Dec. 1, 1983, Ser. No. 557,721**

**Int. Cl.³ H01H** *61/08, 71/14*

**U.S. Cl. 337—140** **31 Claims**



1. Electric overcurrent protective apparatus comprising, in combination:

switch means comprising switch contacts connectable in a circuit for controlling power supplied to protected apparatus and a switch operator movable for effecting operation of said contacts for disconnecting power to said protected apparatus;

actuating means adjustably positioned relative to said switch operator and engagable with said switch operator upon movement of said actuating means for effecting contact operating movement of said switch operator, said actuating means comprising current sensing shape memory effect (SME) means connectable in circuit with said protected apparatus, said SME means being thermally responsive to current flow in said protected apparatus and

temperature responsive for effecting said movement of said actuating means; and

temperature sensitive means thermally responsive to ambient temperature for adjusting the position of said actuating means relative to said switch operator for changing the amount of said actuating means movement required for effecting contact operating movement of said switch operator.

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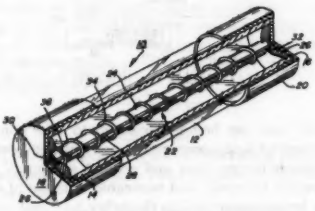
**4,517,544**

## TIME DELAY ELECTRIC FUSE

**Vernon R. Spaunhorst, Washington, Mo., assignor to McGraw-Edison Company, Rolling Meadows, Ill.**

**Filed Oct. 24, 1983, Ser. No. 545,041**
**Int. Cl.³ H01H *85/04***
**U.S. Cl. 337—164** **18 Claims**



1. A time delay fuse comprising:

an insulative housing including first and second ends,

first and second electrically conductive ferrules attached on said first and second ends of said housing, respectively,

a fuse element including in combination, an elongated substantially straight electrically insulated core within said housing, at least one substantially straight wire extending along the external length of said core, a second longer wire being supported by said core and engaging said straight wire so as to establish a plurality of point contacts between said straight wire and said longer wire, and

said straight and longer wires each being electrically connected in series with said conductive ferrules, said straight and longer wires each having a first end and a second end, wherein said first end of said straight wire and said first end of said longer wire each being electrically connected to said first ferrule and wherein said second end of said straight wire and said second end of said longer wire each being electrically connected to said second ferrule.

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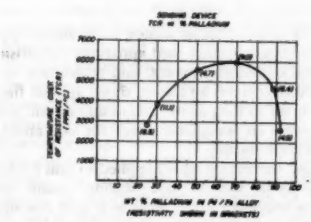
**4,517,545**

## THICK FILM TEMPERATURE SENSITIVE DEVICE AND METHOD AND MATERIAL FOR MAKING THE SAME

**Kenneth M. Merz, Gladwyne, Pa., assignor to TRW Inc., Redondo Beach, Calif.**

**Filed Jan. 22, 1982, Ser. No. 341,781**
**Int. Cl.³ H01C *7/04*; B44D *1/20*; C23B *5/62***
**U.S. Cl. 338—25** **56 Claims**



1. A material for a temperature sensitive device comprising a mixture of glass frit and fine particles containing palladium and iron, the palladium and iron of the fine particles being present in the mixure in an amount having a total weight between about 15% and 65%, and the glass frit being present in an amount between 35% and 85% by weight.

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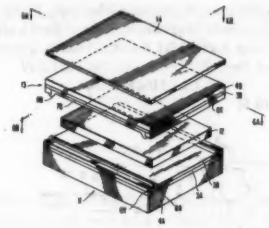
**4,517,546**

## RESISTOR SHEET INPUT TABLET FOR THE INPUT OF TWO-DIMENSIONAL PATTERNS

**Takeshi Kakuhashi; Hiroshi Tahara, and Yoshihisa Mori, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jul. 19, 1983, Ser. No. 515,228**
**Claims priority, application Japan, Jul. 19, 1982, 57-126069**
**Int. Cl.³ H01C *1/01***
**U.S. Cl. 338—320** **7 Claims**



1. A resistor sheet input tablet comprising two rectangular resistor sheets which face each other and are contacted electrically together through an elastic presure-sensitive conductive sheet, wherein each resistor sheet is provided with electrodes at two opposite edges thereof, wherein said rectangular resistor sheets are superimposed such that the electrodes on one of said resistor sheets lie perpendicularly to those on the other resistor sheets, wherein each of said resistor sheets have a two resistor layer construction comprising (a) a main resistor layer consisting of a thin metal film deposited on a conductive layer, wherein said main resistor layer is bonded to (b) an electrically insulating layer and (c) a protective resistor layer formed on the surface of said main resistor layer.

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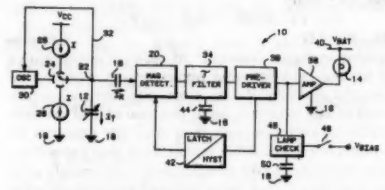
**4,517,547**

## WATER-IN-FUEL SENSOR CIRCUIT AND METHOD

**Randall C. Gray, Scottsdale, and W. Eric Main, Mesa, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Filed Nov. 20, 1981, Ser. No. 323,643**
**Int. Cl.³ B60Q *1/00***
**U.S. Cl. 340—59** **22 Claims**



1. A sensing circuit for detecting a change in the capacitance of a variable capacitor, comprising:

a first capacitor having a substantially constant and predetermined value, said first capacitor being connected at a first circuit node essentially in parallel with the variable capacitor;

means coupled to said first circuit node for alternately sourc-

ing a substantially constant current to and then from said first circuit node;

detector circuit means operative coupled to said first capacitor for detecting the absolute magnitude of the current flowing through said first capacitor as said first capacitor is alternately charged and then discharged by a portion of said current sourced to and from said first circuit node flowing therethrough and comparing said detected current to a current of predetermined and substantially constant magnitude, said current flowing through said first capacitor varying in magnitude as the capacitance of the variable capacitor varies such that the difference current between said detected current and said current of predetermined magnitude is indicative of the variation in the capacitance value of the variable capacitor.

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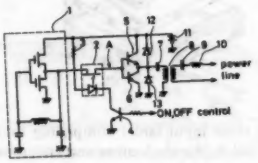
**4,517,548**

## TRANSMITTER/RECEIVER CIRCUIT FOR SIGNAL TRANSMISSION OVER POWER WIRING

**Masahiro Ise, Kashihara; Katsuyuki Machino, Nara; Hidehiko Tanaka, and Toshiyuki Matsubara, both of Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 20, 1982, Ser. No. 451,019**
**Int. Cl.³ H04B** *3/54*
**U.S. Cl. 340—310 R** **1 Claim**




1. A transmitter/receiver circuit for power wiring transmission system comprising a transmitting circuit in which the output of a sine wave oscillator is fed to an emitter-follower through a photocoupler and this output is then fed to the indoor distribution line through a series resonance circuit after passing through a step-down transformer; and a receiving circuit in which the signal from the distribution line is fed to a parallel resonance circuit after passing through a series resonance circuit and that the input and output sections are resistor terminated.

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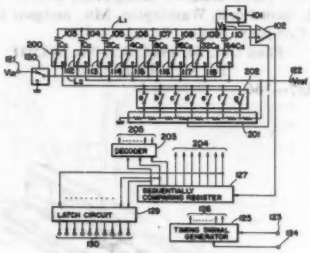
**4,517,549**

## WEIGHTED CAPACITOR ANALOGUE-DIGITAL CONVERTERS

**Shosaku Tsukakoshi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan**

**Filed Aug. 17, 1981, Ser. No. 293,264**
**Claims priority, application Japan, Aug. 25, 1980, 55-115835; Sep. 22, 1980, 55-130605**
**Int. Cl.³ H03K** *13/02, 13/17*
**U.S. Cl. 340—347 AD** **8 Claims**

1. In an analogue-digital converter of the type comprising a comparator having inverting and non-inverting input terminals, an array of a plurality of capacitors with their one terminals connected to said inverting input terminal of said comparator, a plurality of switches with their movable contacts respectively connected to the other terminals of said capacitors, one stationary contacts of said switches being commonly connected to an analogue signal input terminal through an additonal switch which alternately connects said stationary contacts to a ground potential and the other stationary contacts of said switches being connected to a source of a reference voltage, said capacitors in said array respectively having capacitances of $1, 2, 4, \ldots 2^{n-1}$ times a unit capacitance in their order in said array, where n is an integer, a first capacitor having a unit capacitance and having one terminal connected to said inverting input terminal of said comparator, a sequentially comparing register which is supplied with outputs of said comparator for producing a digital signal corresponding to said input analog signal and switch control code signals adapted to control said switches, a timing signal generator for disconnecting said one stationary contacts of said switches from said analogue signal input terminal, the improvement which comprises a resistance voltage divider having a mid tap and connected between said source of reference voltage and




ground, said mid tap being connected to said non-inverting input terminal of said comparator, and further comprising a transfer switch having first and second stationary terminals and a moveable terminal, said moveable terminal of said transfer switch being connected to the other terminal of said first capacitor for transferring the connection of the other terminal of said first capacitor between said first stationary contact of said transfer switch which is connected to said analogue signal input terminal through said additional switch and said second stationary contact of said transfer switch.

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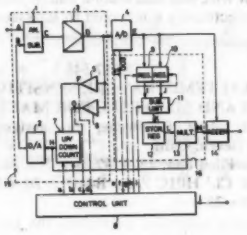
**4,517,550**

## ANALOG TO DIGITAL CONVERSION METHOD AND APPARATUS

**Kenji Nakamura, Osaka, and Shigeru Ideno, Kyoto, both of Japan, assignors to Shimadu Corporation, Kyoto, Japan**

**Filed Mar. 19, 1982, Ser. No. 359,956**
**Claims priority, application Japan, Oct. 27, 1981, 56-172643**
**Int. Cl.³ H03K** *13/02*
**U.S. Cl. 340—347 CC** **6 Claims**




1. Apparatus for converting an analog input signal applied thereto to a digital output signal, said apparatus comprising:

analog to digital conversion means, said conversion means being adapted to convert an analog signal applied thereto to a digital signal so long as the magnitude of said analog signal lies within an acceptable range for said analog to digital conversion means;

means for scaling the analog signal applied to said analog to digital conversion means, said scaling means being adapted when necessary to (1) perform at least one adjustment step with respect to said analog input signal applied to said apparatus and thereby generate an adjusted analog

signal lying within said range, and to (2) apply said adjusted analog signal to said analog to digital conversion means;

means for calibrating said scaling means by determining the effect of the performance of said scaling means upon the digital signal produced by said analog to digital conversion means and for producing a digital signal in accordance therewith wherein said calibration means comprises:

means for determining the effect of the performance of a single adjustment step by said scaling means upon the digital signal produced by said analog to digital conversion means and for generating a digital signal in accordance therewith;

means for storing said digital signal generated by said determining means; and,

means for multiplying said stored digital value by a digital value indicative of the number of adjustment steps required by said scaling means; and,

means for performing at least one mathematical operation with respect to said digital signal produced by said calibrating means and said digital signal produced by said analog to digital conversion means, the result of said mathematical operation being the digital output signal of said apparatus.

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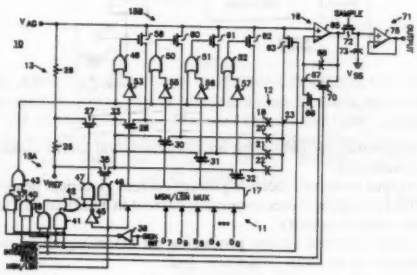
**4,517,551**

## DIGITAL TO ANALOG CONVERTER CIRCUIT

**Jules D. Campbell, Jr., Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 3, 1983, Ser. No. 455,390**
**Int. Cl.³ H03K** *13/02*
**U.S. Cl. 340—347 DA** **13 Claims**



1. A digital to analog converter for providing an analog output signal corresponding to a digital input number of either positive or negative polarity, comprising:

input means for receiving said digital input number having n bits including a sign bit and n−1 magnitude bits, where n is an integer, and for coupling either a first portion or a second portion of the n−1 magnitude bits to an output thereof;

capacitance means coupled to said input means comprising a rank ordered plurality of capacitor having selectively interconnected first electrodes and interconnected second electrodes, for developing a first electrical charge thereon proportional to the first portion of said n−1 magnitude bits and a second electrical charge thereon proportional to the second portion of said n−1 magnitude bits;

reference voltage means for providing a predetermined reference voltage;

reference voltage switching means coupled to both the reference voltage means and the output of the input means, for selectively coupling the reference voltage means to selective first electrodes of the capacitance means in response to the digital input number;

charge sequence control means coupled to the output of the input means, to said capacitance means and to said reference voltage means, for selectively charging and discharging said rank ordered plurality of capacitors in response to the polarity of said digital input number; and

integration means coupled to the interconnected second electrodes of said capacitance means, for translating both the first and second electrical charge across said capacitance means into said analog output signal.

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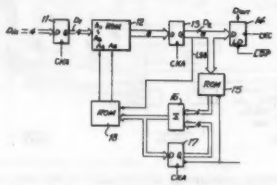
**4,517,552**

## METHOD AND APPARATUS FOR N-TO-M ENCODING

**Norihisa Shirota, Hadano, and Takao Abe, Sagamihara, both of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed May 20, 1982, Ser. No. 380,336**
**Claims priority, application Japan, May 26, 1981, 56-79677**
**Int. Cl.³ H03K** *13/24*
**U.S. Cl. 340—347 DD** **22 Claims**



1. A method of encoding successive n-bit information words into successive m-bit words having a minimum interval between bit transitions of at least 2T (where T is the bit interval of each code word), and a predetermined maximum interval between bit transitions, and wherein m>n, comprising the steps of storing for each n-bit information word a respective set of m-bit code words, each of predetermined ones of said sets being formed of two code words having zero disparity and one of said two code words commencing with a binary "0" bit and the other commencing with a binary "1" bit, and each of the remaining ones of said sets being formed of four code words, two of said four code words having positive disparity and commencing with binary "0" and binary "1" bits, respectively, and the remaining two code words having negative disparity and commencing with binary "0" and binary "1" bits, respectively; identifying in each set of code words assigned to an input information word those code words commencing with the same bit as the last bit of the immediately preceding code word; and addressing among the selected code words the code word whose disparity, when combined with the digital sum variation of the preceding encoded code words, reduces the overall digital sum variation of the encoded code words toward zero.

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**4,517,553**

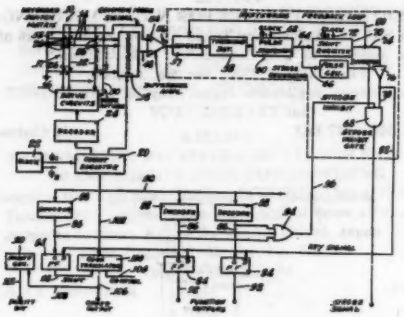
## N-KEY ROLLOVER KEYBOARD

**Keith A. Engstrom, River Grove, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Division of Ser. No. 339,476, Mar. 8, 1973, abandoned, which is a continuation of Ser. No. 144,902, May 19, 1971, abandoned. This application Apr. 4, 1974, Ser. No. 457,884**
**The portion of the term of this patent subsequent to Jun. 28, 2000, has been disclaimed.**
**Int. Cl.³ G06F** *3/02*; **G08C** *15/12*
**U.S. Cl. 340—365 S** **27 Claims**

1. An N-Key Rollover Type Keyboard comprising: a switching matrix having a plurality of drive wires and a plurality of sense wires arranged to form a plurality of junctures where signal coupling between said drive wires and said sense wires can occur, means for scanning said drive wires and said sense wires in timed relation, a plurality of manually operable switches for selectively coupling said drive wires and said sense wires at their junctures for coupling a series of pulses

therebetween, a memory device having an output means sequentially coupling said sense wires to the input of said memory device to receive said series of pulses when present on the respective sense wires, a strobe generator, and means for coupling input signals of said memory device and output signals of said memory device to said strobe generator, said strobe generator comparing therein said input signals and said output signals to effect a strobe pulse output on the first scan of said sense wires when a switch at a given juncture is closed, said strobe



pulse output being produced when said input and output signals are different and thereafter preventing a strobe pulse output when said output signal is the same; and wherein said means for sequentially coupling the sense wires to the input of the memory device comprises a multiplexer having an input connected to said sense wires, a summer connected to the output of the multiplexer, the output of the summer being connected to a threshold detector, and a pulse stretcher interconnecting the threshold detector and the memory device.

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**4,517,554**

## METHOD AND APPARATUS FOR INSPECTING A DANGER ALARM SYSTEM

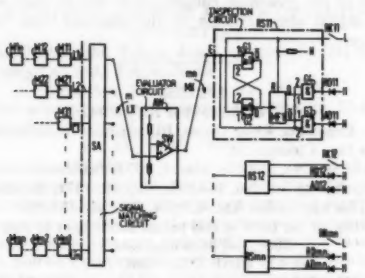
**Otto W. Moser, and Peer Thilo, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed May 4, 1982, Ser. No. 374,756**

**Claims priority, application Fed. Rep. of Germany, May 26, 1981, 3120986**

**Int. Cl.³ G08B *23/00***

**U.S. Cl. 340—514** **15 Claims**



**8**. An apparatus for inspecting a danger alarm system having a plurality of alarm units respectively connected in series in a plurality of alarm lines, a central station, and a multiplexer means for cyclically connecting said alarm lines to said central station, said alarm units emitting an alarm signal upon the occurrence of danger conditions in an area monitored by said alarm unit, and emitting an inspection signal of shorter duration and said alarm signal during an inspection of said system, said apparatus being disposed at said central station and comprising:

an alarm display means;

an inspection display means; and

an evaluator means interconnected between said multiplexer and said alarm display means and said inspection display means for directing signals received from said alarm units during an inspection to said inspection display means, said evaluator means having a path during said inspection from said alarm unit being inspected to said alarm display means such that no suppression of alarm signals received from said alarm units during said inspection occurs.

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**4,517,555**

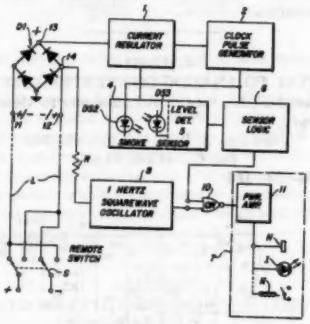
## SMOKE DETECTOR WITH REMOTE ALARM INDICATION

**Angelo A. Marsocci, Duxbury, and Walter F. Schuchard, Hingham, both of Mass., assignors to American District Telegraph Co., Jersey City, N.J.**

**Filed Apr. 17, 1984, Ser. No. 601,256**

**Int. Cl.³ G08B *19/00, 17/10***

**U.S. Cl. 340—522** **9 Claims**



**1**. Apparatus for indicating an environmental alarm condition comprising:

two input terminals receiving direct current electrical power from a remote source supplying current in a normal and an alternative polarity,

an environmental sensor producing an alarm signal in response to an alarm condition, and

an alarm responsive to the alarm signal to indicate the alarm condition in a first mode of indication;

characterized by means for sensing the polarity of current at the power input terminals including a generator of a secondary signal distinguished from the alarm signal when current at the input terminals is in the alternative polarity; and

means coupling the sensing means and secondary signal to the alarm to cause the alarm to operate in a second mode of indication.

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**4,517,556**

## AUTOMATIC BYPASS SWITCH FOR HOUSEHOLD SECURITY SYSTEM

**Ben Saul, Montreal, and Doug Hartley, Dollard des Ormeaux, both of Canada, assignors to Sur-Gard Security Systems Ltd., Montreal, Canada**

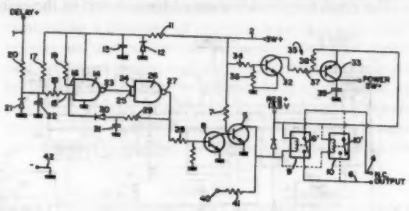
**Filed Dec. 23, 1982, Ser. No. 452,509**

**Int. Cl.³ G08B *23/00***

**U.S. Cl. 340—528** **10 Claims**

**1**. An automatic electronic switch circuit for use with an electronic alarm system having intrusion detection means, means to arm or disarm said system, said alarm system having a delay circuit to safely identify intrusion after a time delay during which the user arms the system and vacates an area to

be protected through a closure member, said switch circuit comprising a first switch circuit connected to a first input to sense when said system is armed or disarmed, a second switch circuit connected to a second input to which said delay circuit is also connected to sense when said delay circuit is closed or open, switch means connected to said first and second switch



circuits for activating or deactivating said detection means depending on the condition of said first and second switch circuits, an alarm state sensing circuit connected to said second switch circuit to condition said switch means to operate upon receiving a positive signal from said first switch circuit that said area has been vacated through said closure member.

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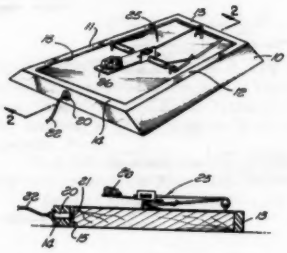
**4,517,557**

## ALARM HOUSING FOR RODENT CONTROL DEVICE

**Michael H. Agron, Santa Monica; James R. Buch, San Pedro, and Robert E. LaVoie, Thousand Oaks, all of Calif., assignors to Ace Pest & Termite Control Co., Culver City, Calif.**

**Filed Jun. 21, 1983, Ser. No. 506,287**
**Int. Cl.³ G08B *21/00***
**U.S. Cl. 340—540** **7 Claims**



1. An alarm housing for a rodent control device, comprising in combination:

a frame having means defining a trap opening in said frame for receiving a rodent trap; and

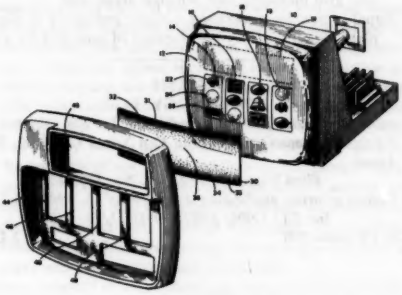
an electrical switch mounted in said frame and having a switch actuating element movable between circuit open and circuit closed conditions, whereby a trap when positioned in said frame opening moves said switch actuating element to one of said circuit conditions, and tripping of the trap moves the trap out of said frame opening so that said switch actuating element may move to the other of said circuit conditions.

**4,517,558**

## THREE DIMENSIONAL VIDEO SCREEN DISPLAY EFFECT

**Robert E. Davids, Reno, Nev., assignor to International Game Technology, Reno, Nev.**

**Filed May 3, 1982, Ser. No. 374,016**
**Int. Cl.³ G07F *17/34*; G09G *1/00***
**U.S. Cl. 340—700** **7 Claims**



1. A video display apparatus comprising:

(a) a view screen showing a display of a plurality of horizontally aligned two dimensional display segments,

(b) a mask secured in front of said screen having one or more viewing ports formed thereon for framing said display, and

(c) a film secured to the front surface of said screen and covering the entire area of said viewing port said film having only two darkened areas, one extending horizontally across the top and the other horizontally across the bottom of said film, said darkened areas having a continuous tone gradient from darkest along the upper and lower edges of said film to lightest adjacent the center of said film to provide an unshaded horizontal substantially optically clear strip extending across the center of said film, said film being positioned relative to said viewing port so that said substantially clear strip is only along the approximate center thereof, whereby a three dimensional visual effect is given to said two dimensional display segments viewed through said film.

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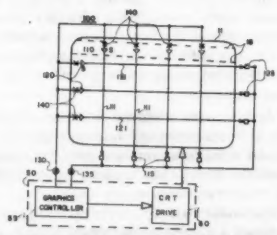
**4,517,559**

## OPTICAL GATING SCHEME FOR DISPLAY TOUCH CONTROL

**Leonard Deitch, Skokie, and Terrance Knowles, Lincolnshire, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Aug. 12, 1982, Ser. No. 407,419**
**Int. Cl.³ G09G *1/00***
**U.S. Cl. 340—712** **22 Claims**




1. A touch-operated interactive display system including a

cathode ray tube having a phosphor covered faceplate and scansion means for energizing the phosphor to illuminate said faceplate;

graphics control means for controlling the graphics displayed on said faceplate in response to touching of selected areas thereof by the user;

grid producing means including light beam producing means responsive to the illumination from said faceplate for producing a grid of light beams adjacent said faceplate, said grid including said selected areas; and

signal means for generating a signal indicative of the faceplate location of any interruption of said grid by a user.

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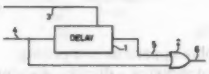
**4,517,560**
**PRINTING SYSTEM**

**Tomio Murayama; Yoshiki Kikuchi, and Takashi Ohmori, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan**

**Filed May 14, 1982, Ser. No. 378,445**
**Claims priority, application Japan, May 15, 1981, 56-72145**
**Int. Cl.³ G09G** *3/00;* **G01D** *15/18, 9/00*
**U.S. Cl. 340—790** **3 Claims**




B

**1**. In a printing system for a printer in which a video signal representing the patterns of a character or symbol is produced to control a printing section to perform printing, the improvement comprising means for printing a character or symbol with emphasis, including means for delaying said video signal for a predetermined period of time to produce a delayed video signal representing a delayed version of an entire character or symbol, and means for logically adding said video signal and said delayed video signal to provide an emphasized video signal, said emphasized video signal being applied to said printing system for printing said character or symbol.

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**4,517,561**
**SELECTIVE CALL, PAGING AND PRIORITY SIGNALLING SYSTEM**

**Timothy M. Burke, Fort Worth, and Scott W. Noble, Bedford, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 28, 1982, Ser. No. 402,690**
**Int. Cl.³ H04Q** *9/00;* **H04B** *7/00;* **H04J** *3/02*
**U.S. Cl. 340—825.07** **5 Claims**

**1**. In a communications system, for voice communications over a communications medium, having a primary station including an address entry port, and a plurality of remote stations, each remote station having a predetermined station address stored in a station address register, a method of automatic selective calling, comprising the steps of:

(a) at the primary station:

(i) entering a desired station address into the address port;

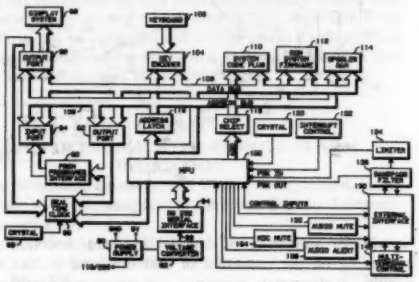
(ii) asynchronously transmitting, automatically, a preambled command signal containing a predetermined control code and the desired station address in response to initiating a voice transmission;

(iii) transmitting, automatically, a postambled command signal containing a second predetermined code, and the desired station address in response to the conclusion of the variable length voice transmission;

(b) at each of said remote stations

(i) receiving said transmitted first command signal;

(ii) detecting when the desired station address contained in the received preambled command signal is the same as the predetermined station address stored in the station



address register and unmuting the remote station receiver in response thereto;

(iii) receiving said transmitted second command signal;

(iv) detecting when the desired station address contained in the received postambled command signal is the same as the predetermined station address stored in the station register and muting the remote station receiver in response thereto.

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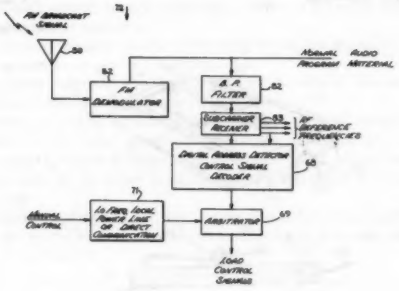
**4,517,562**
**FM COMMUNICATION SYSTEM**

**Louis Martinez, Carson, Calif., assignor to McGraw-Edison Company, Rolling Meadows, Ill.**

**Continuation-in-part of Ser. No. 87,543, Oct. 23, 1979, Pat. No. 4,322,842, and a continuation-in-part of Ser. No. 250,779, Apr. 3, 1981, Pat. No. 4,415,771. This application Mar. 29, 1982, Ser. No. 362,888**
**Int. Cl.³ H04Q** *9/00;* **H04B** *1/00;* **H04J** *6/00*
**U.S. Cl. 340—825.07** **24 Claims**




**1**. A radio communication system for selectively addressing and controlling a plurality of remotely located apparatus comprising in combination:

(a) central controller means adapted to generate digital address and control messages for transmission to at least one local FM radio broadcast station,

(b) a local FM radio broadcast station coupled to receive said digital address and control messages from said controller, and including means for generating inaudible modulated subcarrier signals derived from a subcarrier signal of a subcarrier oscillator, the subcarrier signal being modulated by digital address and control signals responsive to

said address and control messages and synchronized to said subcarrier oscillator and by occasional special sync signals generated at said local FM radio broadcast station, and for adding its normally broadcasted audio program signal to the modulated subcarrier signal and providing a frequency modulated RF signal in response thereto,

(c) a plurality of remotely addressable digital radio receivers controlling a plurality of external apparatus and tuned to receive and demodulate the frequency modulated signal of said broadcast station and comprising means to detect and lock onto said subcarrier signal, to detect special sync signals, to decode said address & control signals synchronously with said subcarrier signal and special sync signals, and selectively respond thereto to control said apparatus.

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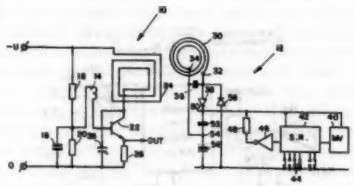
**4,517,563**

## APPARATUS AND METHOD FOR IDENTIFICATION OF OBJECTS

**Emanuel Diamant, Rosh Pina, Israel, assignor to Diuk Tsiyud Haliva, Korazin, Israel**

**Filed Jul. 30, 1982, Ser. No. 403,817**
**Claims priority, application Israel, Aug. 4, 1981, 63502**
**Int. Cl.³ H04Q 9/00**
**U.S. Cl. 340—825.54** **12 Claims**



1. An object identification system comprising:

an active transponder including a signal generator comprising a transmitting coil and an inductor and means for detecting resonance circuit load modulation;

a passive transponder mounted on an object and including a resonance circuit receiving energy transmitted by the active transponder;

a coding circuit, associated with the passive transponder, powered by an electrical signal received from said resonance circuit for selectably modulating said electrical signal, thereby modulating the load on said resonance circuit.

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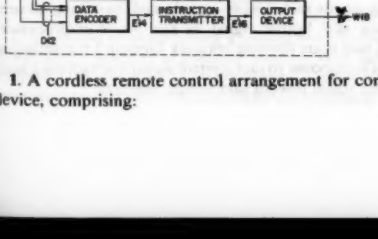
**4,517,564**

## CORDLESS REMOTE CONTROL APPARATUS

**Tatsuo Morishita; Fumio Funakoshi, both of Yokohama; Kenichi Nakamura, Sagamihara, and Kazuo Takamori, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Sep. 15, 1982, Ser. No. 418,542**
**Claims priority, application Japan, Sep. 21, 1981, 56-148993**
**Int. Cl.³ H04Q 9/00; H04B 1/06**
**U.S. Cl. 340—825.69** **21 Claims**



1. A cordless remote control arrangement for controlling a device, comprising:

a portable control unit including:

instruction means for generating an instruction wave and wirelessly transmitting it, said instruction wave including information for controlling said device, and

means for receiving a confirmation wave and indicating in response thereto that said device has been controlled in accordance with said instruction wave; and

a main body containing said device and having a controlled portion, said controlled portion including:

means for receiving said instruction wave and generating a first signal when said device has been controlled in accordance with said instruction wave, said instruction wave receiving means including means responsive to said instruction wave for generating a second signal only when said controlled portion is coupled to said control unit via said instruction wave and providing said device with a control command corresponding to the contents of said instruction wave, said control command directing the actuation of said device, and means for generating said first signal when said second signal disappears and said control command is provided, thereby avoiding overlapping between the instruction wave and the confirmation wave, and

means, coupled to said instruction wave receiving means, for generating, in response to said first signal, a confirmation wave for a given period of time after the generation of said first signal.

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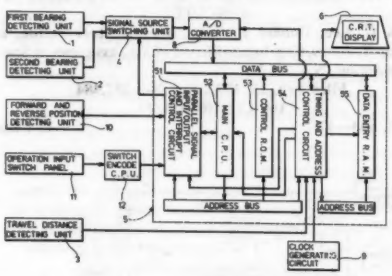
**4,517,565**

## APPARATUS FOR VISUALLY INDICATING THE CURRENT LOCATION OF AN AUTOMOTIVE VEHICLE

**Yukinobu Nakamura; Katsutoshi Tagami, and Tsuneo Takahashi, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 16, 1982, Ser. No. 408,273**
**Claims priority, application Japan, Aug. 21, 1981, 56-130941**
**Int. Cl.³ G08G 1/12**
**U.S. Cl. 340—995** **4 Claims**



1. A current location indicating apparatus for use in an automotive vehicle wherein a current location of said automotive vehicle is arithmetically obtained in terms of two-dimensional coordinates by a signal processing unit on the basis of the outputs from a travel distance detecting unit and a bearing detecting unit, and the current location of the vehicle is visually indicated on the screen of a display from the thus-obtained data in connection with the current location thereof, which comprises, in operative cooperation:

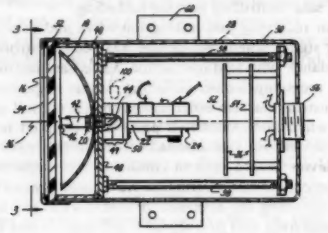
two different types of bearing detecting means, one said bearing detecting means being of a rate gyroscope type and the other bearing detecting means being of an earth magnetism sensor type; and

bearing signal switching means for selectively switching between the outputs from said two types of bearing detecting means.

## 4,517,566
## TRUE GROUND SPEED SENSOR

John H. Bryant, 1505 Sheridan, Ann Arbor, Mich. 48104, and Steven M. Schultz, Ann Arbor, Mich., assignors to John H. Bryant, Ann Arbor, Mich.

Filed Sep. 7, 1982, Ser. No. 415,061
Int. Cl.³ G01S *13/60*
U.S. Cl. 343—8 27 Claims



2. In a Doppler radar sensor for use such as a true ground speed sensor in a ground vehicle, said sensor having transmitter/detector means, antenna feed means coupled with said transmitter/detector means, and reflector means disposed to reflect electromagnetic radiation between the antenna feed and a target area illuminated by the radiation, the improvement comprising said reflector means having a contour corresponding to that of a portion of an ellipse and the antenna feed being centered substantially at one focus of the ellipse.

10. In a Doppler radar sensor having transmitter/detector means, antenna feed means and reflector means, the improvement in which said antenna feed means comprises a circular waveguide assembly having a termination substantially at a focus of the reflector means, said circular waveguide assembly having both microwave and optical transmission properties.

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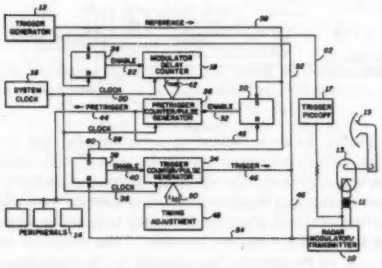
## 4,517,567
## RADAR TRIGGER AND PRETRIGGER GENERATOR HAVING DELAY SENSING AND COMPENSATING CIRCUIT

Patrick G. Lee; Donald E. Bean, both of Ruckersville, and Randy T. Jones, Charlottesville, all of Va., assignors to Sperry Corporation, N.Y., N.Y.

Filed Feb. 25, 1982, Ser. No. 352,484
Int. Cl.³ H03K *5/15*
U.S. Cl. 343—17.7 12 Claims



1. An apparatus for providing a trigger pulse to a circuit and a pretrigger pulse with a preselected time delay between the pretrigger pulse and the responsive signal output from the circuit comprising:

means for providing reference pulses,

means coupled to trigger input means of said circuit and responsive to said reference pulses for generating said trigger pulses after a preselected time delay from said reference pulses,

means coupled to said trigger input means to receive said trigger pulses and to output means of said circuit to receive output signals therefrom for measuring time delays between said trigger pulses and said output signals and for providing signals representative of said measured time delays, and

means coupled to receive said time delay representative signals and said reference pulses for providing pretrigger pulses at a time after receipt of said reference pulses that is equal to said measured time delay.

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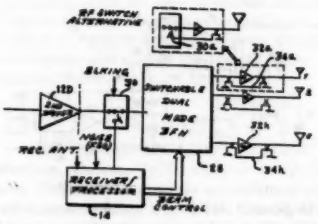
## 4,517,568
## ANGLE SET-ON APPARATUS

Robert R. Willmore, Millersville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 9, 1982, Ser. No. 347,749
Int. Cl.³ G01S *7/38*
U.S. Cl. 343—18 E 7 Claims



1. An angle set-on apparatus for an electronic countermeasure jamming system comprising in combination:

a receiving antenna to receive a hostile signal from a hostile emitter,

a jamming means to generate and transmit a jamming signal, said jamming means receiving said hostile signal from said receiving antenna and modulating a noise signal with the center frequency of said hostile signal,

a switching means connected to the output of said jamming means,

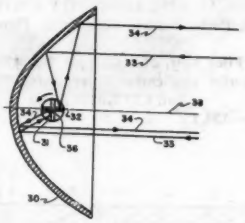
a beam forming network to receive said jamming signal from said switching means, said beam forming network including a dual mode phased array antenna system that is switchable between the receive and transmit mode, and

a receiver/processor means coupled to said receiving antenna, said receiver/processor means identifying said hostile signal and determining its center frequency; said receiver/processor means sampling said jamming signal to center it with respect to the center frequency of said hostile signal, said receiver/processor means providing a control signal, said jamming means providing in response to said hostile signal a window blanking signal which blanks said jamming signal while said receiver/processor means searches in angle for said hostile emitter using the receive mode of said dual mode phase array antenna, said beam forming network receiving said control signal from said receiver/processor means, said beam forming network under control from said receiver/processor means locking on to said hostile signal, said switching means coupling said hostile signal to said receiver/processor means, said beam forming network forming a transmission pattern in response to said control signal and radiating said jamming signal toward said hostile emitter.

## 4,517,569
## PASSIVE RETROREFLECTIVE DOPPLER SHIFT SYSTEM

**Reinhold Gerharz, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 17, 1982, Ser. No. 349,493**
**Int. Cl.³ G01S *13/58*; H01Q *15/16***
**U.S. Cl. 343—18 D** **3 Claims**



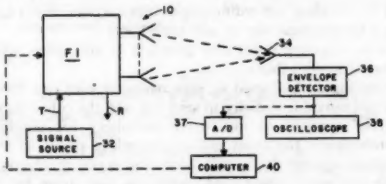

1. A retroreflector system for superposing doppler-shifted signals of known magnitudes on retroreflected carrier signals received from a doppler radar source, said system comprising:

a retroreflector device comprised of a parabolic dish having an activated reflective surface and a modulating means for movement thereof wherein said activated reflective surface is comprised of a rotatable metallic vane positioned with its spin axis close to the focal region of said parabolic dish and its length extending slightly past each side of the focal region wherein the extended reflective surfaces of said rotating metallic vane form said activated reflective surface in which each of said extended reflective surfaces are rotatable through said focal region to impose a doppler-shift frequency on the original carrier signals received from which is focused thereon from said parabolic dish and is reemitted from said retroreflective device back from said parabolic dish in which said doppler-shifted signals may be analyzed by said doppler radar signal source in terms of velocity and target-simulated linear motion wherein said parabolic dish is 15 centimeters diameter across the open front and wherein said rotatable metallic vane has four evenly spaced extended reflective surfaces 1 centimeter wide at said focal region.

## 4,517,570
## METHOD FOR TUNING A PHASED ARRAY ANTENNA

**Roger P. Gray, Jr., Sykesville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Mar. 2, 1983, Ser. No. 471,550**
**Int. Cl.³ H01Q *3/00***
**U.S. Cl. 343—372** **4 Claims**




1. A method of phase tuning a phased array antenna system comprising a plurality of antenna elements, with each element coupled to a transmission line including a phase shift device individual to that element, said method comprising the steps

(a) supplying a signal which is divided to said transmission lines;

(b) phase modulating all of the phase shift devices except for the phase shift device of one element being tuned, the modulation being effectively plus and minus ninety degrees;

(c) the signal being radiated from the array and received by a test antenna placed a predetermined distance from the array and applied to an envelope detector;

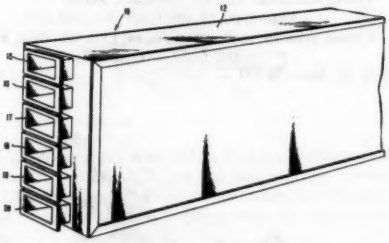
(d) analyzing the envelope as detected by said envelope detector and adjusting the effective electrical length of the transmission line or phase shift for said one element being tuned to obtain a null of said envelope; and

(e) the steps (a) to (d) being repeated for tuning each of said elements.

## 4,517,571
## LIGHTWEIGHT SLOT ARRAY ANTENNA STRUCTURE

**Richard R. Mulliner, Fullerton, and Richard D. Rocke, La Habra, both of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.**

**Filed Jun. 19, 1981, Ser. No. 275,555**
**Int. Cl.³ H01Q *1/42***
**U.S. Cl. 343—771** **20 Claims**



1. A lightweight slot array antenna comprising:

(a) an array of waveguides for radiating or receiving electromagnetic energy comprising:

(i) at least two slotted waveguides, and

(ii) honeycomb disposed between and supporting adjacent waveguides, the honeycomb having a surface area substantially equal to the surface area of the waveguide wall which it supports; and

(b) a radome means, bonded to the array of waveguides, for enclosing and structurally supporting the array of waveguides, the radome means comprising:

(i) at least six dielectric sheets, and

(ii) honeycombed dielectric material disposed between adjacent dielectric sheets.

## 4,517,572
## SYSTEM FOR REDUCING BLOCKING IN AN ANTENNA SWITCHING MATRIX

**Thomas Dixon, Seabrook, Md., assignor to Amstar Corporation, New York, N.Y.**

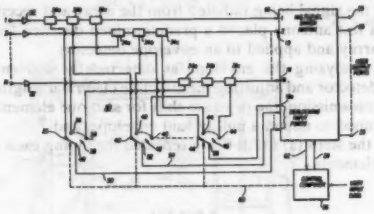
**Filed Jul. 28, 1982, Ser. No. 402,620**
**Int. Cl.³ H01Q *21/30*; H01P *1/10***
**U.S. Cl. 343—876** **2 Claims**

1. An add-on system for facilitating connection between an input port and a desired output port in a multi-level antenna switching matrix of the type including a plurality of inputs each supplied by a respective antenna input signal, a selected number of said input ports being unused ports and wherein said matrix further includes a plurality of output ports supplying a signal to a plurality of receivers, the add-on system comprising:

a plurality of switch devices each one of which is selectively operable for coupling a portion of each one of said an-

tenna input signals to a different one of said unused input ports; and

control means responsive to the detection of a blocked condition which blocked condition is characterized by an attempted connection between a desired one of said input



ports and a desired output port for operating said switching means for coupling the antenna input signal supplying said desired input port to said one of said unused input ports for facilitating the connection thereof to said desired output ports.

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**4,517,573**

**THERMAL INK TRANSFER PRINTING APPARATUS**

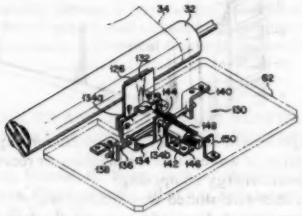
**Masasumi Yana, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Oct. 12, 1983, Ser. No. 541,028**

**Claims priority, application Japan, Oct. 18, 1982, 57-181372**

**Int. Cl.³ G01D** *15/10*

**U.S. Cl. 346—76 PH** **18 Claims**



1. A thermal ink transfer printing apparatus for recording on a recording medium a plurality of characters consisting of letters and blanks comprising:

a platen roller having a rotating shaft and rotatable around the rotating shaft;

a carriage arranged adjacent to the platen roller;

a moving means for moving the carriage along the rotating shaft of the platen roller;

a thermal head including a plurality of heating elements arranged on a line crossing the moving direction of the carriage and selectively generating heat in response to electrical signals of the characters;

a supporting means for supporting the thermal head to the carriage in such a way that the thermal head can reciprocate in relation to the platen roller;

an ink film having a base layer and an ink layer on the base layer;

a running means for running the ink film between the thermal head and the platen roller with its base layer directed to the thermal head;

a pressing means for pressing the thermal head against the platen roller to bring the ink film into close contact with the recording medium supplied between the ink film and the platen roller;

a detecting means for detecting that the number of characters to be applied to the thermal head is a predetermined serial number of blanks to thereby generate a stop signal; and

a releasing and stopping means for releasing, when the stop signal is applied, the thermal head from the pressing means and stopping the running of the ink film driven by the running means, upon laps of a certain time from the time when a signal relating to the last letter just before the blanks to be followed is applied to the thermal head.

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**4,517,574**

**OPTICAL DISC HUMIDITY PROTECTED**

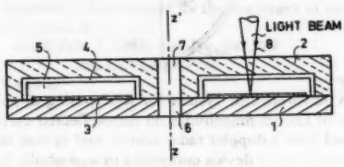
**Jean Cornet, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Mar. 21, 1983, Ser. No. 477,368**

**Claims priority, application France, Mar. 23, 1982, 82 04915**

**Int. Cl.³ G01D** *15/34*

**U.S. Cl. 346—135.1** **27 Claims**




1. A protected optical disc intended for recording information, comprising:

a casing having walls delimiting a chamber containing a layer sensitive to an optical radiation, said layer comprising a recording surface exposed to an atmosphere filling said chamber and carried by one of said walls, said casing being permeable to said optical radiation along at least one of said walls and another of said walls is coated with a surface condensate producing means having a water vapor hydrophylous surface exposed to said atmosphere, said hydrophylous surface having aqueous nuclei forming seeding sites for the growth of water droplets corresponding to deposition of humidity from said atmosphere below its dew point.

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**4,517,575**

**RECORDING PAPER CLAMPING APPARATUS**

**Atsushi Kakimoto, Yao, and Masaaki Takita, Ibaragi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**PCT No. PCT/JP82/00128, § 371 Date Dec. 20, 1982, § 102(e) Date Dec. 20, 1982, PCT Pub. No. WO82/03601, PCT Pub. Date Oct. 28, 1982**

**PCT Filed Apr. 19, 1982, Ser. No. 457,079**

**Claims priority, application Japan, Apr. 20, 1981, 56-60191**

**Int. Cl.³ G01D** *15/28;* **B41F** *27/06;* **B65R** *5/14;* **G03G** *15/00*

**U.S. Cl. 346—138** **5 Claims**

1. Recording paper winding apparatus comprising:

a rotary drum having an air-pervious circumferential periphery for winding recording paper thereon, said drum having a longitudinal slot in said periphery;

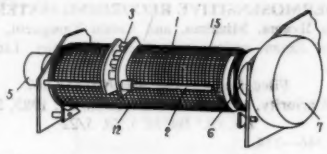
means for creating a negative pressure in said drum when paper is wound thereon;

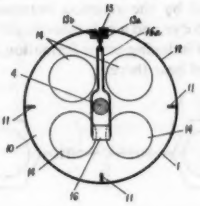
a bar having an L-shaped section arranged with one flange thereof movable radially in said slot and the other flange thereof opposed to said drum periphery for pinching therebetween the front end of recording paper so that rotation of said drum will wind the paper therearound with the paper being held tightly on said drum by the negative pressure therein;

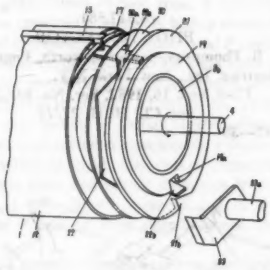
means engaged with said bar and drum for urging said bar to pinching position;

motor means for driving said drum; and

means engageable with said drum for stopping rotation thereof with said bar uppermost when said motor means is shut off, for raising said bar to paper-receiving position, and for allowing said bar to return to paper pinching position after the front end of the paper has been inserted between said one flange and said drum periphery, to wind the paper therearound when the motor means is restarted and thus hold the paper tightly on said drum by the negative pressure therein, said engageable means including:







bar-engaging and raising means mounted to the ends of said drum for rotation about the axis thereof and for linear movement diametrically of said axis;

disc means mounted to said drum ends for rotation about said axis and having notch means in the periphery thereof; and

detent means engageable in said notch means for stopping rotation of said drum with the bar uppermost and for pushing said bar-engaging and raising means upward to engage and raise said bar.

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**4,517,576**

## MULTI-COLOR PEN RECORDING DEVICE

**Fukuo Sugawara, Tamayama, Japan, assignor to Alps Electric Co., Ltd., Japan**

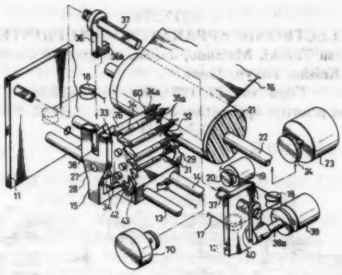
**Filed Sep. 30, 1982, Ser. No. 431,060**

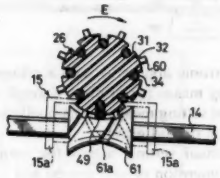
**Claims priority, application Japan, Feb. 25, 1982, 57-26085[U]**

**Int. Cl.³ G01D *15/16***

**U.S. Cl. 346—139 R** **3 Claims**

1. A recording device for recording data in any of a plurality of colors; including a carriage adapted to be moved across a recording paper and having a rotary drum carrying a plurality of recording pens spaced around the periphery of said drum, said pens being capable of writing in respective colors; means for rotating said drum to bring a selected one of said pens into printing position, said rotation means including a cam carried slidably along a shaft extending along the path of movement of





said carriage but rotatable with said shaft, and co-acting means formed respectively on said drum and said cam for rotating said drum upon rotation of said shaft; and means for bringing a pen in said printing position into engagement with said recording paper.

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**4,517,577**

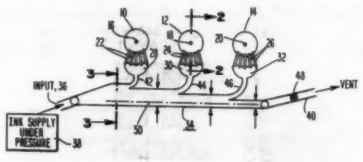
## METHOD OF AND APPARATUS FOR PRIMING AN INK JET

**Hector Miranda, Yorktown Heights, and Thomas W. DeYoung, Stormville, both of N.Y., assignors to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Feb. 10, 1983, Ser. No. 465,519**

**Int. Cl.³ G01D *15/18***

**U.S. Cl. 346—140 R** **15 Claims**




1. An ink jet apparatus for producing droplets of ink on demand comprising:

a chamber for receiving ink including an ink inlet and orifice for ejecting droplets of ink;

transducer means coupled to said chamber for creating selective volumetric changes in said chamber in response to the state of energization of said transducer for ejecting droplets of ink on demand;

ink supply means including an input and a vent to atmosphere for supplying ink to said chamber, said supply

means creating a flow of ink during priming through said supply means from said input, past said inlet to said vent; and

valve means coupled to said vent so as to permit said vent to be opened during priming and closed after priming.

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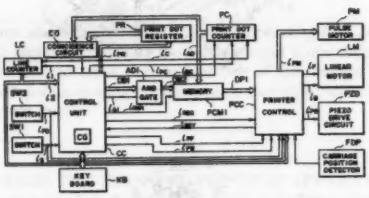
**4,517,578**

## ELECTRONIC APPARATUS WITH PRINTER

**Shigemitsu Tazaki, Matsudo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 21, 1983, Ser. No. 553,816**
**Claims priority, application Japan, Dec. 1, 1982, 57-210905**
**Int. Cl.³ G01D *15/18***
**U.S. Cl. 346—140 R** **3 Claims**




1. An electronic apparatus with a printer comprising:

dot printing means for printing a graph on a printing sheet;

first manual setting means for manually selecting the vertical dimension of said graph;

second manual setting means for manually selecting the lateral dimension of said graph; and

control means for graph printing in variable dimensions in the vertical and lateral directions by driving said dot printing means according to the selections provided by said first and second manual setting means.

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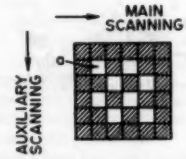
**4,517,579**

## ELECTROSTATIC RECORDING APPARATUS FORMING SMALL NON-RECORDING REGIONS IN A RECORDING FIELD

**Takashi Kitamura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 186,583, Sep. 12, 1980, abandoned. This application Nov. 8, 1983, Ser. No. 550,057**
**Claims priority, application Japan, Sep. 20, 1979, 54-121500; Nov. 30, 1979, 54-155309; Dec. 26, 1979, 54-169563**
**Int. Cl.³ G01D *15/14***
**U.S. Cl. 346—160** **20 Claims**




1. Electrostatic recording apparatus for forming small non-recording regions in a recording field comprising:

beam generating means for generating a beam modulated with a modulation signal;

irradiating means for directing the beam obtained from said bean generating means to a photosensitive member for forming an electrostatic image;

determining means for determining if the electrostatic image formed by said beam on said photosensitive member exceeds a determined dimension;

interrupting means for interrupting intermittently emission of said beam at small time intervals; and

actuating means for actuating said interrupting means when said determining means determines that said electrostatic image formed by said beam exceeds the determined dimension.

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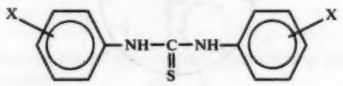
**4,517,580**

## THERMOSENSITIVE RECORDING MATERIAL

**Kiyotaka Iiyama, Mishima, and Keishi Taniguchi, Shizuoka, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Jan. 6, 1984, Ser. No. 568,847**
**Claims priority, application Japan, Jan. 19, 1983, 58-6897**
**Int. Cl.³ B41M *5/18, 5/22***
**U.S. Cl. 346—214** **9 Claims**

1. A thermosensitive recording material comprising a support material and a thermosensitive coloring layer formed thereon, in which thermosensitive coloring layer, colored images are formed by the reaction between a colorless or light-colored leuco dye and a color-developer of the following formula capable of inducing color formation in said leuco dye upon application of heat thereto,




wherein X indicates halogen.

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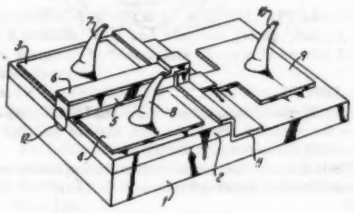
**4,517,581**

## PHOTODETECTOR

**George H. B. Thompson, Sawbridgeworth, England, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed Nov. 16, 1982, Ser. No. 442,054**
**Int. Cl.³ H01L *27/14***
**U.S. Cl. 357—30** **10 Claims**



1. A junction field effect transistor photodetector comprising: a semi-insulating substrate; a semiconductive layer of one type deposited on the substrate; and a relatively narrow rib of semiconductive material of an opposite type deposited on the layer and protruding therefrom; wherein source and drain contacts are provided on the semiconductive layer on opposite sides of the rib and a gate contact is provided on said rib, the rib has a root portion adjacent the layer formed of a higher band gap lower refractive index material covering an optically absorbing lower band gap higher refractive index material of said layer at or immediately beneath the root of the rib disposed such that the rib forms an optical waveguide adapted to guide light, and the lower band gap higher refractive index material of the layer absorbs light in said optical absorbing material.

## 4,517,582

## ASYMMETRICAL THYRISTOR WITH HIGHLY DOPED ANODE BASE LAYER REGION FOR OPTIMIZED BLOCKING AND FORWARD VOLTAGES

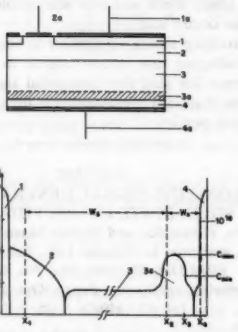
Roland Sittig, Umiken, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Aug. 25, 1982, Ser. No. 411,274

Claims priority, application Switzerland, Aug. 25, 1981, 5465/81

Int. Cl.³ H01L *29/74*

U.S. Cl. 357—38 1 Claim



1. An asymmetrical thyristor comprising:

at least four zones of alternately opposite conductivity type including a relatively high doped outer P emitter zone, a relatively lightly doped N base zone, a relatively lightly doped P base zone and a relatively highly doped N emitter zone layered one on top of the other, said P emitter and N emitter zones contacting respective main electrodes, and said N emitter zone having a recess through which said P base zone extends to contact a control electrode;

said N base zone having a partial region adjacent the P emitter zone, said partial region having a doping concentration (C) which is higher than that of remaining regions in the N base zone and which decreases from a higher value ($C_{max}$) to a lower value ($C_{min}$) in a direction towards the P emitter zone perpendicular to the four zones;

wherein with a predetermined maximum forward blocking voltage applied to the main electrodes there is formed a blocking layer in said N base zone and a neutral zone $W_n$ extending from the edge of the blocking layer in the N base zone into the P emitter zone to a location $X_4$ where the doping concentration of the P emitter zone reaches $1 \cdot X10^{18}$ cm $^{-3}$;

said doping concentration (C) having the value $C_{min}$ at a location $X_3$ which is at least 30 percent of the width of the neutral zone $W_n$ away from the edge of the blocking layer; and

the width of the neutral zone ($W_n$) being in the range between $1 \cdot 10^{-3}$ cm and $8 \cdot 10^{-3}$ cm and having a value which is calculated in accordance with

$$W_n = \frac{0.6}{F} \cdot \frac{\tau_R}{\tau_G} \cdot \sqrt{\frac{10^{14}\text{cm}^{-3}}{C_{max}}} \cdot W_S$$

wherein $\tau_R$ refers to the mean recombination life span of the minority charge carriers in the partial region, $\tau_G$ refers to the mean generation life span of the minority charge carriers in the blocking layer having a width $W_S$ and F is defined by

$$F = \frac{\int_{X_2}^{X_3} C(X)\,dx}{C_{max}(X_3 - X_2)}$$

which is the integral across the doping concentration (C) from the edge of the blocking layer in the inner N doped zone at $X_2$ to the location $X_3$ at which the doping concentration (C) reaches the value $C_{min}$ in the partial region and which is standardized to the integral across a constant doping concentration on the level of $C_{max}$ between the same limits.

## 4,517,583

## SEMICONDUCTOR INTEGRATED CIRCUIT INCLUDING A FUSE ELEMENT

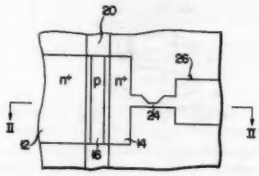
Yukimasa Uchida, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 351,280, Feb. 22, 1982, abandoned. This application Oct. 4, 1984, Ser. No. 657,478

Claims priority, application Japan, Mar. 3, 1981, 56-30207

Int. Cl.³ H01L *29/10, 29/12, 21/86, 29/76*

U.S. Cl. 357—41 9 Claims



1. A semiconductor integrated circuit comprising:

a MOS transistor element;

an insulating layer formed adjacent to said transistor element; and

monocrystalline silicon wiring formed on said insulating layer, connected to said transistor element at one end thereof, and having a fuse as a part thereof, said monocrystalline silicon wiring being integrally formed with one of the source and drain of said MOS transistor element.

## 4,517,584

## CERAMIC PACKAGED SEMICONDUCTOR DEVICE

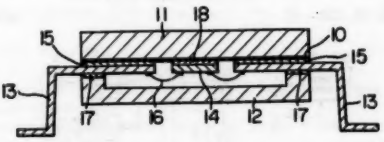
Yasuo Matsushita; Kousuke Nakamura, and Mitsuru Ura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 10, 1982, Ser. No. 448,592

Claims priority, application Japan, Dec. 11, 1981, 56-200644

Int. Cl.³ H01L *23/34, 23/36, 23/14*

U.S. Cl. 357—80 23 Claims



1. A semiconductor device, comprising:

an insulating substrate comprising non-oxide ceramic as the main component and having a coefficient of thermal expansion approximating to that of a semiconductor material and a thermal conductivity not smaller than 0.2 cal/-sec.cm.° C. at room temperature, an oxide layer having

sufficient thickness to provide a good bonding strength provided on the substrate and a glass layer provided on the oxide layer;

at least one semiconductor element disposed at a predetermined location on one surface of the insulating substrate;

a cap member of ceramic bonded to be a preselected portion on the one surface of the insulating substrate, thereby forming a package hermetically enclosing the semiconductor element together with the insulating substrate; and

a terminal means whose one end is electrically connected to the semiconductor element within the package and whose other end is exposed at the outside of the package.

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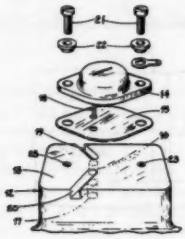
**4,517,585**

## HEAT SINK FOR SEMI-CONDUCTOR DEVICES HAVING TERMINALS PROJECTING FROM A HEAT SINK TRANSFER FACE

**Paul S. Ridout, and Colin Birks, both of Birmingham, England, assignors to Lucas Chloride EV Systems Limited, Birmingham, England**

**Filed Aug. 13, 1982, Ser. No. 407,874**
**Int. Cl.³ H01L** *23/40, 23/34, 23/12, 23/14*
**U.S. Cl. 357—81** **7 Claims**



1. A heat sink for a semi-conductor device of the type which have terminal pins projecting from a heat transfer face of the semi-conductor device case; the heat sink having a thickness greater than the length of the terminal pins and having an integral mounting face against which the heat transfer face of the semi-conductor device case is to be mounted, such mounting face being formed with clearance bores to receive the pins and also with grooves extending along the mounting face to permit wires connected to the pins to lie on the same side of the heat sink as the semi-conductor device case.

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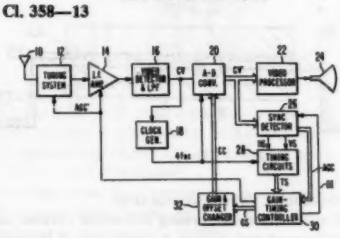
**4,517,586**

## DIGITAL TELEVISION RECEIVER WITH ANALOG-TO-DIGITAL CONVERTER HAVING TIME MULTIPLEXED GAIN

**Alvin R. Balaban, Lebanon, and Steven A. Steckler, Clark, both of N.J., assignors to RCA Corporation, Princeton, N.J.**

**Filed Nov. 23, 1982, Ser. No. 443,929**
**Int. Cl.³ H04N** *9/32*
**U.S. Cl. 358—13** **18 Claims**



1. In a television receiver including a source of analog video signals having a predetermined range of analog levels and having repetitive line signals with at least first and second sequential signal portions therein, and processing means for processing digital video samples, apparatus comprising:

analog-to-digital converting means coupled to said source for developing digital video samples, having a full range of digital values, for representing said analog signals, wherein said converting means includes means responsive to a control signal for changing the correspondence between said digital video samples and said analog signals to substantially change the range of analog levels which may be represented by said full range of digital values;

timing means responsive to one of said analog video signals and said digital video samples for providing signals indicating times when said first and second sequential signal portions occur; and

gain controlling means responsive to said indicating signals for developing said control signal to obtain said correspondence for said first sequential signal portion that is different than said corresendence for said second sequential signal portion.

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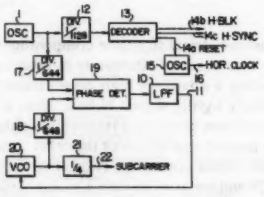
**4,517,587**

## SYNCHRONIZING SIGNAL GENERATING CIRCUIT FOR SOLID-STATE COLOR VIDEO CAMERA

**Iwao Aizawa, Hiratsuka, and Michio Masuda, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 25, 1982, Ser. No. 436,360**
**Claims priority, application Japan, Oct. 26, 1981, 56-170017**
**Int. Cl.³ H04N** *5/06, 9/44*
**U.S. Cl. 358—17** **4 Claims**




1. A synchronizing signal generating circuit for a solid-state color video camera comprising first oscillator means for generating an oscillation output signal having a frequeney which is n (n: an integer) times as high as the horizontal frequency, and first frequency divider means for dividing the frequency of the oscillation output signal from said first oscillator means to produce a pulse signal having a recurrence frequency equal to the horizontal frequency, said circuit further comprising second oscillator means for generating a horizontal scanning clock pulse signal for a solid-state image sensing device, said pulse signal having the recurrence frequency equal to the horizontal frequency being used to reset the oscillating operation of said second oscillator means, so that the horizontal scanning clock pulse signal can be controlled to be maintained at the same fixed phase in each horizontal period.

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**4,517,588**

## COLOR SOLID STATE IMAGE PICK-UP DEVICE

**Tetsuro Kuwayama; Nobuyoshi Tanaka, and Seiji Hashimoto, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 28, 1982, Ser. No. 402,602**
**Claims priority, application Japan, Jul. 31, 1981, 56-119175**
**Int. Cl.³ H04N** *9/07*
**U.S. Cl. 358—44** **4 Claims**

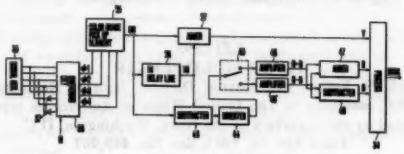
1. A color solid state image pick-up apparatus, comprising:

(a) a solid state image pick-up device for transducing an optical picture image into an electrical signal, said pick-up device having a plurality of rows;

(b) filter means in an incident light path to the solid state

image pick-up device for imparting different spectral characteristics to light incident on a portion of the solid state image pick-up device;

(c) operation means for forming a signal corresponding to a brightness by adding output signals from a plurality of rows of the solid state image pick-up device with a predetermined ratio;



(d) low-frequency selecting means for selecting and emitting a low-frequency component of the output signal from a predetermined row of the solid state image pick-up device; and

(e) mixing means for mixing the output of the operation means with the output of the low-frequency selecting means.

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**4,517,589**

## COLORED IMAGE READING APPARATUS

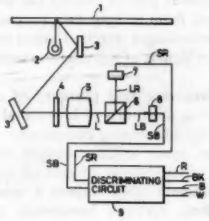
**Takeshi Baba, and Kazuhiko Matsuoka, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 7, 1982, Ser. No. 433,223**

**Claims priority, application Japan, Oct. 13, 1981, 56-163632; Oct. 13, 1981, 56-163633**

**Int. Cl.³ H04N *1/46***

**U.S. Cl. 358—75** **6 Claims**




1. An apparatus for reading a colored image on the surface of an original, comprising:

light source means for illuminating the surface of the original;

light detecting means;

a transmitting optical system for separating the light beam from the surface of the original into a light beam of short wavelength zone and a light beam of long wavelength zone and directing them to said light detecting means;

a processing circuit for effecting an operation between the signals from said light detecting means and obtaining a plurality of signals; and

a circuit for converting said plurality of electrical signals into signals corresponding to predetermined colors;

the overall spectral characteristic of a system comprising said light source means, said transmitting optical system and said light detecting means satisfying

$$540\ \text{nm} \leqq [\lambda'b+\lambda'r](\lambda'b+\lambda'r)/2 \leqq 600\ \text{nm}$$

$$60\ \text{nm} \leqq \lambda'r-\lambda'b \leqq 260\ \text{nm}$$

where $\lambda'b$ is a wavelength exhibiting a maximum transmission factor of the light beam of short wavelength zone and $\lambda'r$ is a wavelength exhibiting a maximum transmission factor of the light beam of long wavelength zone.

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**4,517,590**

## COLOR PRINTING APPARATUS

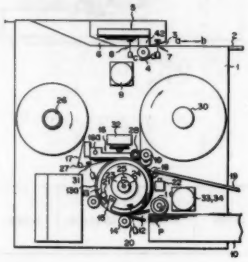
**Masayoshi Nagashima, Chigasaki, and Hiroshi Yamane, Ebina, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Oct. 28, 1982, Ser. No. 437,194**

**Claims priority, application Japan, Oct. 31, 1981, 56-175449; Oct. 31, 1981, 56-175450; Oct. 31, 1981, 56-175451; Feb. 18, 1982, 57-23638; Feb. 18, 1982, 57-25022; Feb. 18, 1982, 57-25023**

**Int. Cl.³ H04N *1/46***

**U.S. Cl. 358—75** **12 Claims**



1. A color printing apparatus comprising:

a reading section for scanning a document to produce a plurality of image signals corresponding to a plurality of fundamental colors in a document pattern of the document;

a coloring medium having a substrate sheet and a repeating pattern of a plurality of color ink layers which are formed on the substrate sheet and correspond to the fundamental colors;

a printing section including thermal head means coupled with the reading section, and a drum for holding a paper on its circumference, said drum rotating for a number of times corresponding to the number of fundamental colors for each color print;

said thermal head means being driven in accordance with the color image signals to thermally transfer one of said plurality of color ink layers to the paper during each rotation of said drum to form a color pattern corresponding to the document pattern on the paper.

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**4,517,591**

## COLOR PRINTING APPARATUS

**Masayoshi Nagashima, Chigasaki; Hiroshi Yamane, Ebina, and Mitsuo Yamashita, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Oct. 28, 1982, Ser. No. 437,193**

**Claims priority, application Japan, Oct. 31, 1981, 56-175448**

**Int. Cl.³ H04N *1/46***

**U.S. Cl. 358—75** **7 Claims**

1. A color printing apparatus comprising:

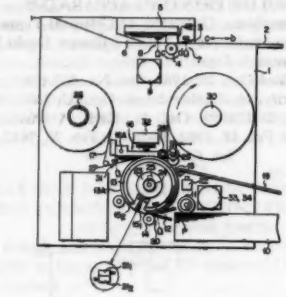
document moving means for reciprocatably moving a document plural times;

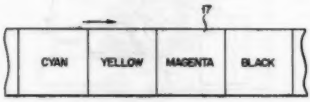
scanning means for scanning the document during one of the forward and backward movements of the document to produce image signals representative of different colors corresponding to a pattern of the scanned document;

paper moving means for reciprocatably moving a paper a plurality of times in synchronism with the reciprocal movement of the document;

thermal head means in close contact with a coloring medium with a repeating pattern of different color ink layers, said thermal head being driven by image signals from said scan-

ning means to press said coloring medium against said paper during movement in one direction and to transfer successively the inks of said ink layer on said coloring medium to said paper; and






means for separating said thermal head means from said paper during movement in the other direction.

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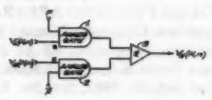
**4,517,592**
**TELEVISION SYSTEM**
**Paul M. Levy, 3 Butternut Ct., Dix Hills, N.Y. 11746**
**Continuation-in-part of Ser. No. 410,121, Aug. 20, 1982, abandoned. This application Sep. 28, 1982, Ser. No. 425,912**
**Int. Cl.³ H04N *9/54***
**U.S. Cl. 358—92** **63 Claims**



1. A television system comprising:
(a) encoding means for forming a composite video signal of a first video signal and a second video signal in time synchronism with said first video signal, said encoding means including means for time multiplexing at the frame rate said first and second video signals;
(b) means for transmitting said composite video signal to means for receiving said composite video signal, said receiving means including means for decoding said received composite video signal to obtain display video signals corresponding to said first and second video signals;
(c) said decoding means including:
(1) means for delaying said received composite video signal for one frame time:
(2) means for correcting the chrominance phase of said one frame delayed composite video signal relative to the chrominance subcarrier reference signal; and
(3) means for time multiplexing at the frame rate said received composite video signal and said chrominance phase corrected one frame delayed composite video signal to obtain said display video signals.

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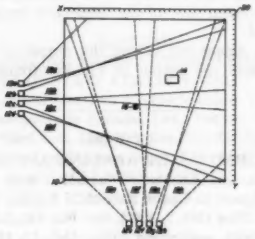
**4,517,593**
**VIDEO MULTIPLEXER**
**Patrick N. Keller, and Clinton D. Seal, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Apr. 29, 1983, Ser. No. 489,987**
**Int. Cl.³ H04N *7/18***
**U.S. Cl. 358—107** **11 Claims**



1. A video multiplexer scoring system apparatus for scoring an event area comprising:
a plurality of cameras placed around the event area, such that it is viewed from at least two perpsectives, each of said cameras providing a standard video output including synchronization signals of a predetermined section of said event area;
means for synchronizing said plurality of camera's video output to provide a pattern of horizontal stripes, where said means for synchronizing comprises:
a synchronization, sync, stripper circuit electrically connected to the video output of one of said plurality of cameras, said camera titled camera **1**, said sync stripper circuit outputting vertical, horizontal, and composite synchronization signals;
a synchronization level shifter circuit connected to said sync stripper circuit output and to the remainder of said plurality of cameras such that said remainder of the plurality of cameras are synchronized, slaved, to camera **1**;
a level shifter connected to said sync stripper output to increase the voltage range of the video output of camera **1**, said level shifter outputting a vertical synchronization signal, a sample signal, and a horizontal synchronization signal;
a black clamp circuit connected to said sample signal output from said level shifter to ground the input signals of said video cameras;
a phase locked loop oscillator connected to the horizontal synchronization signal output of said level shifter, said phase locked loop oscillator synchronized to an integral multiple of the horizontal sync frequency of camera **1**;
a first counter connected to said phase locked loop oscillator which cycles through said integral multple of the horizontal sync frequency of camera **1**;
a second counter inputting said vertical and horizontal sync outputs of said level shifter to count the horizontal lines of said standard video signal and to reset said horizontal line counter after each vertical sync signal;
a programmable read only memory, PROM, connected to said second counter, said PROM programmed to select

specific horizontal lines counted by said second counter and match those lines to a preselected pattern of said plurality of cameras;

a plurality of switches connected between said PROM and said plurality of cameras such that each switch is matched to a specific camera video input;

a flip-flop circuit connected between said first counter and said plurality of switches such that said switches are opened or closed for a preselected count in said first counter;

a composite video output circuit connected to said plurality of switches such that a given horizontal line of video signal is from only one of said plurality of cameras;

means for recording said composite video output connected to said composite video output circuit; and

means for scoring events that appear in said composite video output;

means for recording the occurrence of an event within said area by connecting said recording means to said synchronizing means, such that said pattern of horizontal stripes is recorded; and

means for locating said event within said area by triangulating said recorded synchronized horizontal stripes, said locating means connected to said recording means.

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**4,517,594**

## X-RAY DIAGNOSTIC INSTALLATION

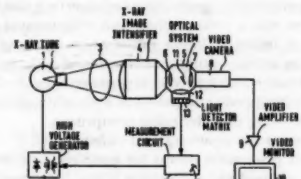
**Heinz Horbaschek, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Jun. 20, 1983, Ser. No. 505,963**

**Claims priority, application Fed. Rep. of Germany, Jul. 5, 1982, 3225061**

**Int. Cl.³ H04N** *7/18;* **G03B** *41/16*

**U.S. Cl. 358—111** **4 Claims**




1. An x-ray diagnostic installation, comprising an x-ray image intensifier television chain including an x-ray image intensifier for supplying a light image at its output in accordance with an incident x-ray image, a video camera, an optics system with a base lens and a camera lens for coupling the video camera with the light image from the x-ray image intensifier, a mirror being disposed in a parallel ray path of said optics system, a light detector coupled with the luminous flux from said image intensifier by means of said mirror, an additional lens being arranged between the mirror and the light detector, the light detector comprising a matrix of photosensors coupled with the luminous flux from said image intensifier by means of said mirror and said additional lens such that respective photosensors supply at their respective outputs respective signals representative of the luminous flux at respective different regions of the light image supplied by said image intensifier, a summing amplifier for supplying an output which is a measure of the brightness of the light image supplied by said image intensifier, and switch means selectively controlling the coupling of the respective photosensors of said matrix with said summing amplifier and selectively determining different configurations of said photosensors of said matrix which contribute to the output from said summing amplifier thereby to select the regions of the light image from said image intensifier which are to be dominant in the assessment of the brightness of said light image.

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**4,517,595**

## PAY TELEVISION CHANNEL SELECTOR

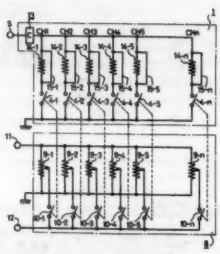
**Katsumi Tobita, Soma, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Oct. 13, 1981, Ser. No. 311,061**

**Claims priority, application Japan, Oct. 15, 1980, 55-146598[U]**

**Int. Cl.³ H04N** *7/16;* **H04K** *1/00*

**U.S. Cl. 358—114** **3 Claims**



1. In a pay television channel selector for CATV having a channel selecting means including channel selecting switches for selecting among the various channels and potentiometers connected to said channel selecting switches for generating tuning voltages for the respective channels; and control means including a plurality of channel pay switches each corresponding to a respective channel selecting switch for producing a control voltage when the channel selected by the channel selected by the channel selecting switches is properly contracted for in order to activate a descrambler circuit; the improvement wherein said control means comprises a plurality of parallel circuits with each of said parallel circuits being connected to a respective one of said channel pay switches and having an output level changed according to an input signal having said common impedance so that a scrambled signal of a contracted channel may be descrambled on the basis of the output control signal of said control circuit.

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**4,517,596**

## SYSTEM COMPRISING A PRELIMINARY PROCESSING DEVICE CONTROLLED IN ACCORDANCE WITH AN AMOUNT OF INFORMATION STORED IN A BUFFER

**Norio Suzuki, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Sep. 29, 1982, Ser. No. 428,501**

**Claims priority, application Japan, Sep. 29, 1981, 56-153019; Sep. 30, 1981, 56-155725; Oct. 9, 1981, 56-160341**

**Int. Cl.³ H04N** *7/13*

**U.S. Cl. 358—133** **15 Claims**

1. An encoding system for encoding input digital video signals to produce transmission variable length codes at a predetermined rate, said encoding system comprising:

buffer means for storing buffer input codes to produce the stored input codes as said transmission variable length codes at said predetermined rate and to additionally produce an amount signal representative of an instantaneous amount of the stored input codes, said buffer means producing said transmission variable length codes together with a transmission control signal representative of said instantaneous amount;

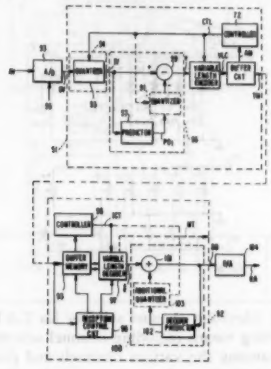
control means responsive to said amount signal for producing an internal control signal representative of said instantaneous amount;

preliminary processing means responsive to said internal

control signal for preliminarily processing said input digital video signals in consideration of said instantaneous amount to produce preliminarily processed digital video signals;

predictive encoding means for predictively encoding said preliminarily processed digital video signals in accordance with a predetermined encoding rule to produce encoded error signals, said predetermined encoding rule being reversible to a decoding rule which is for use in decoding reproductions of said encoded error signals to produce reproductions of said preliminarily processed digital video signals;

variable length encoding means having a plurality of select-



able encoding characteristics and being responsive to said internal control signal for further encoding said encoded error signals to produce preliminary variable length codes in compliance with one of said selectable encoding characteristics that is selected as a selected encoding characteristic in consideration of said instantaneous amount at each instant, said selectable encoding characteristics defining different code lengths, respectively, said preliminary variable length codes thereby being possessed of variable code lengths which are defined from time to time by said selected encoding characteristic; and

signal supplying means for supplying said preliminary variable length codes to said buffer means as said buffer input codes, respectively.

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**4,517,597**

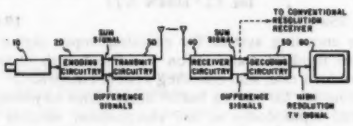
## METHOD AND APPARATUS FOR ENCODING AND DECODING VIDEO

**William E. Glenn, Ft. Lauderdale, Fla., assignor to New York Institute of Technology, Westbury, N.Y.**

**Filed Sep. 14, 1982, Ser. No. 418,055**

**Int. Cl.³ H04N** *5/14*

**U.S. Cl. 358—141** **91 Claims**




1. Apparatus for encoding and decoding a video signal, comprising:

(A) an encoder, including:

means for storing an input video frame as an array of pixel values;

means for interrogating the stored array and for generating (i) a sum signal representative of the sum of the pixel values in a group of pixels, and (ii) a difference signal representative of the difference between the total of the pixel values of some of the pixels in the group and the total of the pixel values of other pixels in the group; the sum signal and the difference signal being generated for a multiplicity of groups which cover the video frame;

said sum signal being generated at a relatively high information rate, and said difference signal being generated at a relatively low information rate;

(B) a decoder, including means for combining the sum and difference signals to obtain an output pixel value for each pixel of an output video frame.

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**4,517,598**

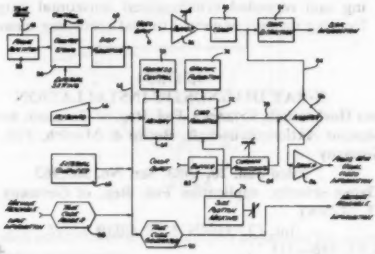
## METHOD AND APPARATUS FOR ELECTRONIC PUBLISHING

**George Van Valkenburg, 220 Lake Rd., Takapuna, Auckland, New Zealand, and John W. Carlquist, Glendale, Calif., assignors to George Van Valkenburg, New Zealand**

**Filed Oct. 22, 1982, Ser. No. 436,005**

**Int. Cl.³ H04N** *7/08, 7/04*

**U.S. Cl. 358—142** **14 Claims**



1. An apparatus for generating and inserting additional video information into a video signal, said video signal including a plurality of fields of video information, each of said fields identified by a pre-existing, predetermined code, said pre-existing code located in a non-visible portion of each of said fields, said pre-existing code comprised of a plurality of bits, a portion of said bits being user definable comprising:

video means for inputting said video signal;

character generation means for generating desired alphanumeric characters for insertion into at least one field of said video signal;

encoding means coupled to said character generation means for encoding data representative of said alphanumeric character into said user definable bits of said predetermined code for said field;

clocking means coupled to said character generation means for signalling said character generation means to generate said alphanumeric character fo. encoding into said user definable bits of said predetermined code independent of said video signal's frame frequency;

whereby said alphanumeric character may be encoded into a plurality of codes identifying a plurality of fields, independent of said video signal's frame frequency.

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**4,517,599**

## RESOLUTION ENHANCEMENT AND ZOOM BY DEGRADATION ESTIMATES

**Robert Zwirn; Edward J. Dragavon, both of Los Angeles, and Brian Smithgall, Hermosa Beach, all of Calif., assignors to Hughes Aircraft Company, El Segundo, Calif.**

**Filed Jan. 27, 1983, Ser. No. 461,354**

**Int. Cl.³ H04N** *5/14*

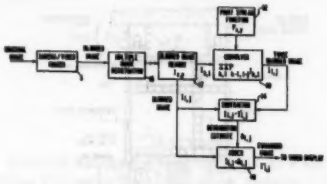
**U.S. Cl. 358—166** **6 Claims**

1. In an imaging system comprising an imager which may view a scene through an aperture characterized by a point spread function and means responsive to said imager for gener-

ating successive frames of video data words characterized by a first sampling rate, a system for enhancing image resolution, comprising:

means for converting said video data words into a synthesized video frame of video data words, said synthesized video frame characterized by a second higher sampling rate;

means for enhancing the resolution of the image represented by said synthesized video frame, comprising:



means for convolving said synthesized video data words with said point spread function to generate a video data word corresponding to a twice-blurred image;

means for subtracting said twice-blurred image video data word from a corresponding one of said synthesized video data words to obtain a video data word corresponding to a degradation estimate; and

means for adding said degradation estimate video data word and said corresponding one of said synthesized video data words to obtain an enhanced image video data word.

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**4,517,600**

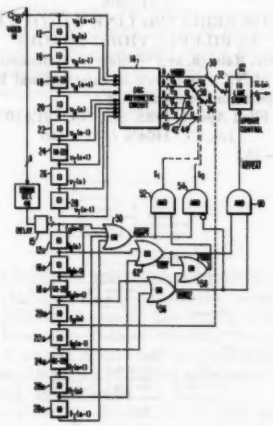
**ERROR CONCEALMENT SYSTEM USING DROPOUT SEVERITY INFORMATION FOR SELECTION OF CONCEALMENT METHOD**

**Glenn A. Reitmeier, Trenton, N.J., assignor to RCA Corporation, Princeton, N.J.**

**Continuation of Ser. No. 379,088, May 17, 1982, abandoned. This application Sep. 7, 1984, Ser. No. 648,350**

**Int. Cl.³ H04N** *5/21, 9/535*

**U.S. Cl. 358—166** **4 Claims**



3. Apparatus for concealing an erroneous sample of a sampled video signal from a source of sampled video signal, said apparatus comprising:

first average estimate generating means coupled to said source of sampled video signal for generating a first estimate of the value of said erroneous sample by averaging the values of first proximate samples located adjacent said erroneous sample in a first direction;

second average estimate generating means coupled to said source of sampled video signal for generating a second estimate of the value of said erroneous sample by averaging the value of second proximate samples located adjacent said erroneous sample in a second direction;

control signal generating means coupled to said source of sampled video signal for generating a control signal indicative of the presence of a defect in one of said first and second proximate samples, whereby one of said first estimate and said second estimate, respectively, is incorrect; and

selecting means coupled to said first average estimate generating means, to said second average estimate generating means, and to said control signal generating means for selecting as a replacement signal for said erroneous sample said first estimate when said control signal indicates the presence of a defect in one of said second proximate samples and for selecting said second estimate when said control signal indicates a defect in one of said first proximate samples.

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**4,517,601**

**POWER-RESPONSIVE GHOST CANCELLING SYSTEM**

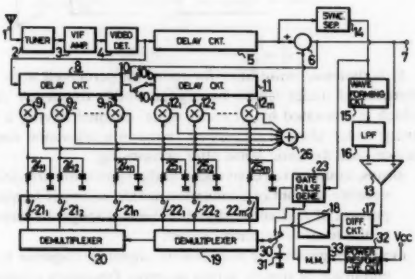
**Hisafumi Yamada, Tokyo; Junya Saito, Wakou, and Ichiro Tsutsui, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Mar. 7, 1983, Ser. No. 472,748**

**Claims priority, application Japan, Mar. 9, 1982, 57-36967**

**Int. Cl.³ H04N** *5/21*

**U.S. Cl. 358—167** **7 Claims**




1. A ghost cancelling system comprising:

(A) signal input means for receiving an input signal which includes desired and ghost signals;

(B) transversal filter means connected to said signal input means and responsive to said desired signal for forming a waveform corresponding to said ghost signal, said transversal filter means including a weighting circuit and memory means having a storage capacitor for storing a weighting function for said weighting circuit;

(C) subtracting means connected between said signal input means and said transversal filter means for subtracting an output of said transversal filter means from said input signal;

(D) a ghost detector connected between the output terminal of said subtracting means and said memory means for detecting a level of said ghost signal to control said memory means such that the weighting function changes in response to the detected level;

(E) signal output means connected to the output terminal of said subtracting means; power responsive means for detecting the time when a power switch is turned on; and activating means connected between said power responsive means and said storage capacitor for charging the

latter during a predetermined period when said power switch is turned on.

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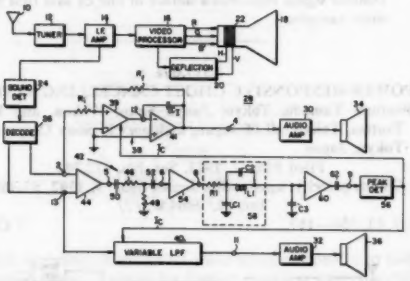
4,517,602

## DYNAMIC NOISE FILTER FOR AN AUDIO SIGNAL IN A TELEVISION

Wesley W. Murphy, III, and James Hettiger, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 18, 1982, Ser. No. 434,935
Int. Cl.³ H04N 5/60
U.S. Cl. 358—198 6 Claims




1. A dynamic noise filter for reducing perceived noise in a reproduced audio signal having an audio frequency range which is processed by an audio signal channel having a relatively wider channel frequency range in a television display device, said dynamic noise filter comprising:

means, coupled to receive said audio signal, for providing a variable amount of attenuation within an upper frequency portion of said audio signal frequency range, in response to the level of a control signal;

means for generating said control signal in response to the amplitude of signals within an upper frequency portion of said channel frequency range including said audio signals within said upper frequency portion of said audio frequency range;

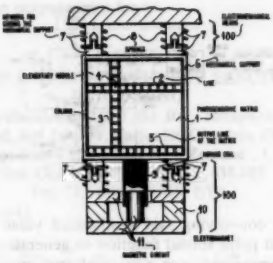
said generating means including a serially coupled filter and signal detector for determining the level of said control signal, said control signal controlling said audio signal attenuation provided by said first mentioned means in a manner inverse to the amplitude of said audio signal within said upper frequency portion of said audio frequency range, wherein said filter has an amplitude versus frequency response characteristic in said channel frequency range of substantially bandpass shape, for passing relatively unattenuated audio signals at frequencies within said upper frequency portion of said channel frequency range which are less than the fundamental frequency of the television horizontal line scanning signal and for providing substantial attenuation to signals at frequencies within said channel frequency range which are greater than said fundamental frequency and include the signals at frequencies of at least some of the lower harmonics of said horizontal line scanning signal such that said signal detector provides no substantial change in control signal level for signals at said fundamental and lower harmonics of said horizontal line scanning signal.

4,517,603

## DEVICE FOR PRODUCING TELEVISED PICTURES WITH A CHARGE TRANSFER MATRIX

Bernard Epsztein, and Lucien Guyot, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Mar. 22, 1982, Ser. No. 360,699
Claims priority, application France, Mar. 27, 1981, 81 06188
Int. Cl.³ H04N 1/028
U.S. Cl. 358—213 5 Claims



1. A device for producing televised pictures comprising a photosensitive matrix having a system of equidistant lines and columns with elementary modules at the intersection of the lines and columns; means for forming an optical image on said matrix; means for processing signals corresponding to points of the image impinging said elementary modules in accordance with an interlaced line scanning mode in which the points of a first interlaced half of the image are formed, and then the points of a second interlaced half are formed by lines alternating with the first; means for ensuring relative displacement of said image with respect to the matrix by a distance equal to half the width of the elementary module, after the processing of a half-image, and for maintaining in said relative displacement position throughout the processing time of the following half-image and for returning to an initial position after processing said following half-image.

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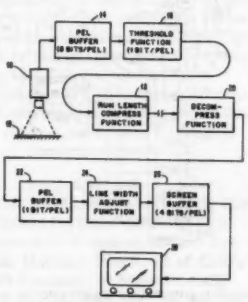
4,517,604

## METHOD FOR REDUCING LINE WIDTH VARIATIONS IN BILEVEL VIDEO IMAGES

Dana A. Lasher, Raleigh, and William K. Stelzenmuller, Morrisville, both of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 4, 1983, Ser. No. 481,610
Int. Cl.³ H04N 1/41, 1/40
U.S. Cl. 358—262 8 Claims




1. For use in a system wherein image pel data is thresholded to bilevel format for transmission to a remote display capable of producing at least trilevel pels, a method of reducing per-

ceptible variations in the widths of lines in the image to be displayed, said method being characterized by the steps of:

analyzing received bilevel data along at least one pel direction to identify regions, each consisting of a run of one or more pels having a first bilevel value bounded at both ends by one or more pels having the second bilevel value; and

converting the pels at or adjacent the ends of selected ones of the runs as a function of run length to provide run-bordering pels having a third value intermediate the bilevel values.

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**4,517,605**

## IMAGE SIGNAL PROCESSING APPARATUS

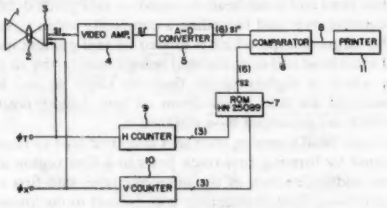
**Yoshikazu Yokomizo, Kawagoe, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 16, 1982, Ser. No. 349,168**

**Claims priority, application Japan, Feb. 27, 1981, 56-27760**

**Int. Cl.³ H04N *1/40***

**U.S. Cl. 358—280** **18 Claims**




1. An image signal processing apparatus comprising:

output means for generating density signals of an image; and

binary signal generating means for providing binary signals of said density signals, said binary signal generating means including dither converter means for performing dither conversion of said density signals by using at least a main dither matrix, said main dither matrix being divided into plural sub-dither matrices wherein parameters of said sub-dither matrices are set in such a manner that a spatial frequency of the dither pattern is low.

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**4,517,606**

## APPARATUS FOR PROCESSING VIDEO SIGNALS

**Yoshikazu Yokomizo, Kawagoe; Takehiko Shibata, Kokubunji; Katsuichi Shimizu, Kunitachi; Ken Miyagi, Yokohama; Akira Suzuki, Kawasaki; Tadashi Yoshida, Tokyo; Masaharu Tsukata, Kawasaki; Koichi Murakami, Yokohama, and Nao Nagashima, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 285,405, Jul. 20, 1981, abandoned. This application Sep. 21, 1984, Ser. No. 654,039**

**Claims priority, application Japan, Jul. 23, 1980, 55-101658**

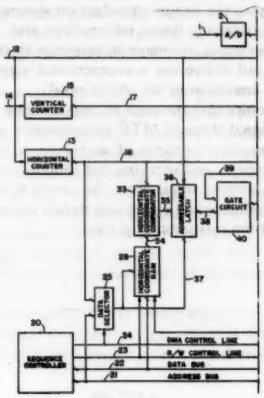
**Int. Cl.³ H04N *1/40***

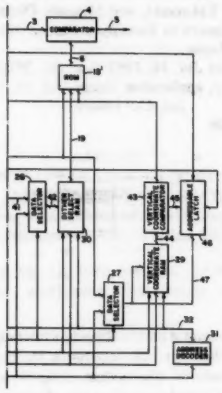
**U.S. Cl. 358—280** **45 Claims**

1. A video signal processing apparatus for providing binary encoded video signals employing a dither coding system, said apparatus comprising:

means for reading an original image;

area setting means for dividing an original image into plural unequal areas; and




processing means for providing binary encoded signals for video signals from said reading means employing different dither patterns for each of said plural areas.

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**4,517,607**

## METHOD OF AND APPARATUS FOR COMPENSATING IMAGE IN IMAGE REPRODUCTION SYSTEM

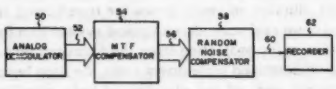
**Fusakichi Ohkouchi, Atsugi, and Kazuhiro Suzuki, Shimizu, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Oct. 29, 1982, Ser. No. 437,781**

**Claims priority, application Japan, Nov. 9, 1981, 56-179272; Nov. 9, 1981, 56-179273**

**Int. Cl.³ H04N *1/40***

**U.S. Cl. 358—284** **14 Claims**




1. In an image reproduction system, a method of compensating an image, which is formed by a plurality of pixels each

being provided with one of two different conditions, by compensating a condition of observed one of the pixels or object pixel in accordance with conditions of the pixels adjacent to the object pixel or surrounding pixels, comprising the steps of:

(a) supplying the image reproduction system with an image signal containing image information; and

(b) compensating an image in response to the input image signal and delivering a compensated signal which indicates a condition of the object pixel;

step (b) comprising the steps of delivering an MTF compensated signal through MTF compensation which accentuates boundary portions of an image in response to the image signal, and carrying out random noise compensation to remove smear from the image in response to the MTF compensated signal and signals indicative of conditions of the surrounding pixels.

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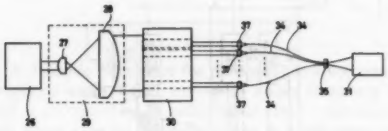
**4,517,608**

## IMAGE RECORDING DEVICE

**Kiyoshi Maeda, Takatsuki, and Masashi Okamoto, Kobe, both of Japan, assignors to Dainippon Screen Manufacturing Co., Ltd., Kyoto, Japan**

**Filed Jul. 14, 1982, Ser. No. 398,027**
**Claims priority, application Japan, Jul. 18, 1981, 56-112564**
**Int. Cl.³ H04N *1/22***
**U.S. Cl. 358—298** **7 Claims**



1. An image scanning and recording system having a recording unit for duplicating and recording halftone images on a photosensitive material, the system comprising:

a beam flattener made up of a pair of cylindrical lenses for flattening a beam of light from a light source and transferring the flattened beam of light to an acousto-optic modulating element;

an acousto-optic light modulating element having a plurality of ultrasonic wave exciting portions disposed side by side on a single acousto-optic medium for independently modulating incident light from the beam flattener with said ultrasonic wave exciting portions independently into a plurality of modulated light beams in response to image signals from a photo electrical scanning means;

a scale down optical system for reducing the diameter of the plurality of modulated light beams from the acousto-optic light modulating element, said scale-down optical system comprising a plurality of small lenses of a size sufficient to reduce the diameter of each one of the modulated light beams; and

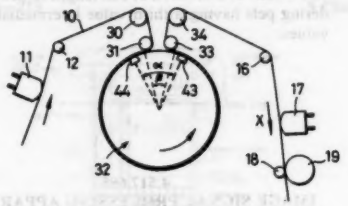
a plurality of light transfer means corresponding in number to said plurality of small lenses for transferring the light beams from said scale-down optical system to a focussing lens system for projecting from the focussing lens system, in a predetermined scale-down ratio, the light beams from the output ends of the plurality of light transfer means onto a film mounted on a recording cylinder, and wherein said plurality of light transfer means comprises an optical fiber bundle.

**4,517,609**

## VIDEO SIGNAL RECORDING APPARATUS

**Ota Yoshihiko, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan**

**Filed Nov. 30, 1982, Ser. No. 445,658**
**Claims priority, application Japan, Dec. 18, 1981, 56-204867**
**Int. Cl.³ H04N *5/78*; G11B *5/02***
**U.S. Cl. 360—22** **8 Claims**



1. A video signal recording apparatus comprising:

a guide drum having an outer peripheral surface;

guiding means for guiding a magnetic tape around a predetermined angular range of $(360°-\beta)$, of the outer peripheral surface of said guide drum, where $\beta$ is a small angle; and

a main head and a sub-head mounted on said guide drum for scanning over and recording a composite video signal on the magnetic tape which is guided by said guiding means,

said main head and said sub-head being separated by an angle $\alpha$ which is slightly larger than the angle $\beta$, and being mounted on said guide drum at two height positions which are separated by a distance d,

said main head scanning over said magnetic tape to record a signal by forming first track parts in a first region along the width direction of the magnetic tape, said first track parts being formed obliquely with respect to the longitudinal direction of the magnetic tape,

said sub-head scanning over said magnetic tape to record a signal by forming second track parts in a second region along the width direction of the magnetic tape, said second track parts being formed obliquely with respect to the longitudinal direction of the magnetic tape, said second region being different from said first region,

said angle $\alpha$ and said distance d having values such that a first predetermined part among said first track parts is continuously end-to-end adjacent a second predetermined track part among said second track parts along an extension of said second predetermined track part, and one track which is made up of said first predetermined track part and said continuous second predetermined track part is equivalent to a standard track of one field of a composite video signal.

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**4,517,610**

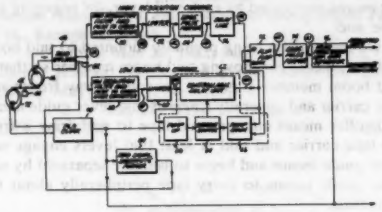
## MULTICHANNEL SIGNAL RECOVERY CIRCUIT

**Vadim B. Minuhin, Bloomington, Minn., assignor to Magnetic Peripherals Inc., Minneapolis, Minn.**

**Filed Dec. 9, 1982, Ser. No. 448,137**
**Int. Cl.³ G11B *5/02, 5/09***
**U.S. Cl. 360—24** **14 Claims**

1. In a multichannel read signal recovery system having a high resolution channel for receiving a read signal and producing a high resolution pulse signal representative of digital information contained in said read signal, and having a low resolution channel for receiving said read signal and producing a low resolution pulse signal representative of digital information contained in said read signal, and having logic means responsive to said high and low resolution pulse signals to recover said digital information, the improvement comprising: variable delay means in one of said channels and connected to said high and low resolution channels, said variable delay

means being responsive to said high and low resolution pulse signals to delay the resolution pulse signal in said one channel



to match any delay of the resolution pulse signal in the other channel.

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**4,517,611**

## VIDEO RECORDING SYSTEM

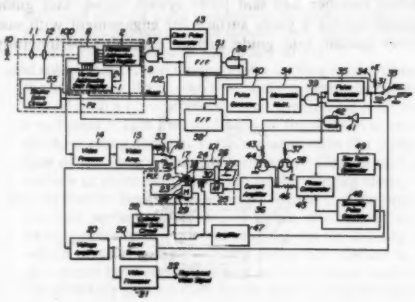
**Kenji Kimura, Tachikawa, Japan, assignor to Olumpus Optical Company Limited, Japan**

**Filed Jun. 15, 1982, Ser. No. 388,598**

**Claims priority, application Japan, Jun. 18, 1981, 56-94514**

**Int. Cl.³ H04N *5/782***

**U.S. Cl. 360—33.1** **7 Claims**



1. In a video recording system including a solid state image sensing device having a number of cells, an optical system for projecting an image of an object to be recorded onto the solid state image sensing device, a shutter means for shielding said solid state image sensing device against the projection of the object image for a read-out period during which charges stored in respective cells are successively read-out to derive a video signal representing an image, a manual shutter release member constructed and arranged to be actuated by a user of the video recording system to provide an actuation signal, a video tape recording device including a magnetic tape moving means for moving a magnetic tape in a forward direction or in a rewinding direction and means for recording said derived video signal on a predetermined portion of said magnetic tape, and control means for controlling said solid state image sensing device, said shutter means, and said video tape recording device, the improvement in said control means comprising:

first timing signal generating means for issuing a first timing signal in response to said actuation signal;

rewind signal generating means responsive to said first timing signal for generating a rewind signal during a predetermined first time period immediately after receipt of said first timing signal, said magnetic tape moving means being responsive to said rewind signal for moving said magnetic tape in the rewinding direction during said first time period;

forward movement signal generating means responsive to the expiration of said first time period for generating a forward movement signal immediately after said first time period has terminated, said magnetic tape moving means being responsive to said forward movement signal for moving said magnetic tape in the forward direction at a given constant speed;

second timing signal generating means responsive to the termination of said first time period for generating a second timing signal immediately after said first time period has terminated;

detecting means coupled to detect the presence of a video signal recorded on said magnetic tape and for generating a third timing signal upon the detection of the absence of a video signal recorded on said magnetic tape;

fourth timing signal generating means responsive to the occurrence of both said second and third timing signals for generating a fourth timing signal following the receipt of both said second and third timing signals, said shutter means being responsive to said fourth timing signal to open said shutter for a predetermined second time period; and

means responsive to said fourth timing signal for causing said successive read-out of the charges stored in the respective cells of said solid state imaging device to derive said video signal.

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**4,517,612**

## REPRODUCING APPARATUS WITH CONTROLLED GAIN OUTPUT INDEPENDENT OF TRACKING ERRORS

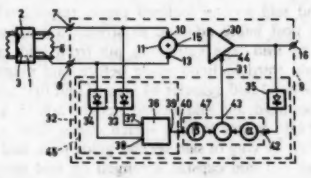
**Albert M. A. Rijckaert, and Edmond de Niet, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 22, 1982, Ser. No. 401,042**

**Claims priority, application Netherlands, Aug. 17, 1981, 8103833**

**Int. Cl.³ G11B *5/02***

**U.S. Cl. 360—67** **13 Claims**



13. An apparatus for reproducing information from a track on a magnetic record carrier, said apparatus comprising a reproducing head having two reproducing portions each supplying an information signal representative of information read from said track, means for combining said information signals so as produce a sum signal representative of the sum of said information signals, means for determining which of said information signals is the larger signal, said determining means generating a first signal which is proportional to the amplitude of the larger of said information signals, means for generating a second signal proportional to the sum of the amplitude of said information signals, and variable gain amplifying means for amplifying said sum signal in dependence on said first and second signals by a gain factor substantially equal to a constant multiplied by the ratio of said first signal to said second signal so as to compensate for tracking errors.

**4,517,613**

## MAGNETIC RECORDING AND PLAYBACK APPARATUS

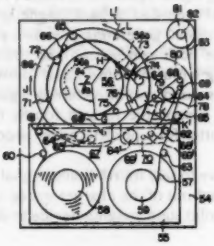
**Narito Shibaike, Habikino; Seiko Minamide, Nara; Satoshi Kikuya, Katano; Hiroshi Terada, Hirakata, and Osamu Zaitsu, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Jun. 16, 1982, Ser. No. 388,939**

**Claims priority, application Japan, Jun. 24, 1981, 56-97876**

**Int. Cl.³ G11B *5/08***

**U.S. Cl. 360—85** **6 Claims**



**1.** A magnetic recording and playback apparatus, in which a magnetic tape is extracted by means of a tape extracting pin from a tape cassette and wound around a cylinder incorporating therein rotary heads over a predetermined angle so that said rotary heads record and play back signals on said magnetic tape, said apparatus comprising a base plate for holding reel bases vertically and for mounting thereon said tape cassette in parallel therewith, and first, second and third inclined guide planes of different directions and angles of inclination with respect to said base plate, said cylinder incorporating therein said rotary heads arranged perpendicularly on said first inclined plane, said apparatus further comprising a first guide post and an eraser head arranged perpendicularly with respect to said third inclined plane, a second guide post, a sound/control head and a capstan arranged perpendicularly with respect to said second inclined plane, means for bringing and keeping a pinch roller into a posture perpendicular to said second inclined plane during travelling of a tape, and first and second inclined posts arranged in the vicinity of intersecting lines of said base plate and said third inclined plane, and of said base plate and said second inclined plane, respectively, said first inclined post being adapted to stretch a magnetic tape extracted by said tape extracting pin from said tape cassette, along said third inclined plane before said magnetic tape is wound around said cylinder by way of said first guide post and said eraser head, and said second inclined post being adapted to redirect said magnetic tape which comes from said cylinder and travels by way of said second guide post, said sound/control head and said capstan arranged on said second inclined plane, so that the magnetic tape stretches in parallel with said base plate.

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**4,517,614**

## MECHANISM FOR EXTRACTING TAPE FROM A TAPE CARRIER

**Albert M. Straub, Howell; Theodore R. Mabrey, and Daniel L. Vokovich, both of Ann Arbor, all of Mich., assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Jun. 30, 1982, Ser. No. 393,591**

**Int. Cl.³ G11B *15/66***

**U.S. Cl. 360—85** **15 Claims**

**1.** A mechanism for withdrawing tape from a tape carrier and to carry the tape to form a path about a portion of a transducer, said mechanism comprising:

a movable boom member;

a lever system comprising at least two levers;

a lever guide means for contacting each of said at least two levers and defining a path for said levers to follow, said lever guide means being spaced from said tape carrier;

roller means, supported by each said lever, for engaging said tape; and

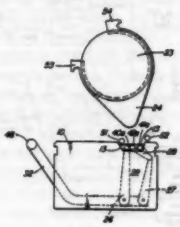
said two levers each being pivotally mounted to said boom member, means for moving said boom member so that as said boom member is moved generally away fronm said tape carrier and generally towards said lever guide means said roller means engages said tape to withdraw it from the tape carrier and said at least two levers engage said lever guide means and begin to become separated by said lever guide means to carry tape peripherally about the transducer.

**6.** A mechanism for withdrawing tape from a tape cartridge and wrapping said tape less than 360° around the curved portion of a cylindrical transducer means, said mechanism comprising:

a pivotally mounted boom member;

a lever system having at least two levers pivotally mounted to said boom member, each said lever carrying a roller means for engaging said tape in such a manner that as said lever system is moved generally away from said tape cartridge and generally towards said transducer means, tape can be withdrawn from said cartridge;

a lever guide means, mounted adjacent said transducer means, in a plane parallel to a plane through which said boom member and said lever system move, said guide means having a guide surface for engagement with said lever system, said guide surface extending peripherally



about said transducer means such that said lever system engages said guide surface and does not engage said transducer means;

means for moving said boom member so that said guide surface acts as a guide for said two levers and causes said levers to separate when it engages said guide surface such that at least a first lever moves along a first path defined by said lever guide means and at least a second lever moves along a second path defined by said lever guide means.

**11.** A mechanism for withdrawing tape from a tape cartridge, said mechanism comprising:

a lever guide means;

a boom member;

a lever system, comprising a plurality of lever members for engaging and carrying the tape to form a path about a portion of a transducer, said lever members being supported by said boom member on a first portion of said boom member;

a drive means for moving said boom member about a pivot point located a remote distance from said first portion, thereby moving said lever members generally away from said tape cartridge and generally toward said lever guide means such that, when said lever members contact said guide means, said lever members separate such that at least a first lever member moves along a first path defined by said lever guide means and at least a second lever member moves along a second path defined by said lever guide means.

## 4,517,615
## ROTARY HEAD FOR MAGNETIC TAPE RECORD AND PLAYBACK

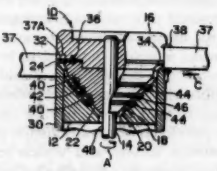
**Hiromasa Hino, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 20, 1982, Ser. No. 380,270**

**Claims priority, application Japan, May 28, 1981, 56-78113[U]; May 28, 1981, 56-81429[U]**

**Int. Cl.³ G11B *5/52, 21/04***

**U.S. Cl. 360—108** **19 Claims**




1. Rotary magnetic head apparatus for use in recording and playing back video signals comprising:

a rotary head drum supported by a driving shaft and having an outer surface which is generally cylindrical, said drum being rotatable when driven by the shaft;

a stationary head drum coaxially disposed on an axis aligned with said driving shaft and having an outer surface which is generally cylindrical and substantially equal in diameter to said outer surface of the rotary drum;

said rotary head drum having a first surface means opposing the stationary drum, the first surface means being generally of such a conical shape about the driving shaft and of a sufficient length longitudinally of the shaft as to produce air flow along the first surface means onto the outer surface of the rotary drum to form an air film on said outer surface in response to rotation of the driving shaft;

said stationary head drum having a second surface opposing the first surface of the rotary drum, the second surface being generally of a conical shape about the driving shaft, which shape is complementary to the first surface to form gap means between said rotary and stationary head drums for directing said air flow to the outer surfaces thereof to form an air film thereon; and

a plurality of magnetic heads supported on said rotary drum closely to the outer surfaces of the rotary and stationary drums in the gap means.

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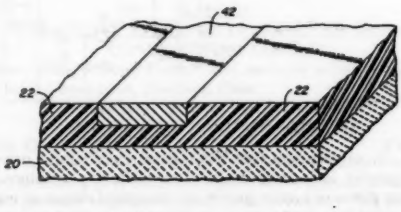
## 4,517,616
## THIN FILM MAGNETIC RECORDING TRANSDUCER HAVING EMBEDDED POLE PIECE DESIGN

**Peter G. Bischoff, Cupertino, Calif., assignor to Memorex Corporation, Santa Clara, Calif.**

**Division of Ser. No. 367,366, Apr. 12, 1982, Pat. No. 4,391,849. This application Mar. 28, 1983, Ser. No. 479,224**

**Int. Cl.³ G11B *5/16***

**U.S. Cl. 360—126** **5 Claims**




1. In an improved thin film magnetic recording transducer comprising a thin film magnetic transducer metal deployed in a pattern adapted for magnetic read/write operations, wherein the improvement comprises that said pattern is disposed in associated depressions in the surface of a layer of non-magnetic, non-conductive dielectric material, said depressions being formed to exhibit sidewalls which are orthogonal to the dielectric surface, the magnetic transducer metal filling said depressions wherein the exposed surface of the metal is effectively coplanar with the surface of the dielectric material.

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## 4,517,617
## FLEXIBLE MAGNETIC DISK CASSETTE AND A RECORDING AND/OR REPRODUCING APPARATUS FOR THE SAME

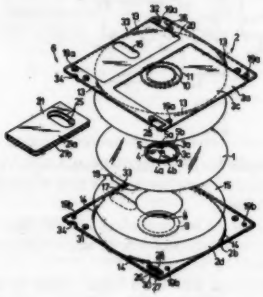
**Akira Tsuji, Fujisawa; Sadayuki Ito, Yokohama, and Kazumi Fujimoto, Hino, all of Japan, assignors to Sony Coporation, Tokyo, Japan**

**Filed Aug. 13, 1981, Ser. No. 292,914**

**Claims priority, application Japan, Aug. 14, 1980, 55-115307[U]**

**Int. Cl.³ G11B *23/02***

**U.S. Cl. 360—133** **10 Claims**



1. A flexible magnetic disk cassette, comprising:

(a) a flexible magnetic disk;

(b) a cover containing said magnetic disk, said cover having a drive hole means for providing access to drive said flexible magnetic disk from outside said cover, a recording opening means for exposing a recording surface of said flexible magnetic disk, and a cut-out portion means provided on one side of said cover for detecting correction installation of said flexible magnetic disk cassette into a recording and/or reproducing apparatus;

(c) a shutter means slidably provided on said cover for selectively exposing said recording surface through said recording opening means and exposing said cut-out portion means when said flexible magnetic disk is ready for use; and

(d) said shutter means preventing a correct installation of said magnetic disk cassette when the shutter means covers said cut-out portion means.

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## 4,517,618
## PROTECTION CIRCUITRY FOR HIGH VOLTAGE DRIVERS

**G. Haven Frank, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 6, 1983, Ser. No. 529,412**

**Int. Cl.³ H02H *3/24***

**U.S. Cl. 361—58** **5 Claims**

1. A load protection circuit interposed between a power source and a load comprising:

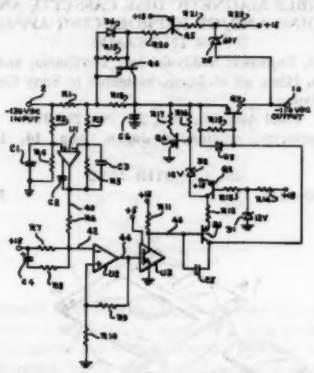
a high voltage input terminal, a high voltage output terminal and a reference terminal,

current sensing means, voltage risetime control means and

output control means serially connected between said high voltage input terminal and said high voltage output terminal,

a capacitive filter connected between the junction of said voltage risetime control means and said output control means and said reference terminal,

current comparison and limiter means coupled to said current sensing means for providing a first logic signal when the load current is within a predetermined maximum limit,



first gating means for providing a second logic signal during the simultaneous presence of said first logic signal and a first low voltage,

second gating means for providing a third logic signal during the simultaneous presence of said second logic signal and a second low voltage, and

means for applying said third logic signal to said output control means to activate said output control means whereby said power source is coupled to said load.

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**4,517,619**

## PROTECTIVE RELAY SYSTEM FOR A POWER SYSTEM

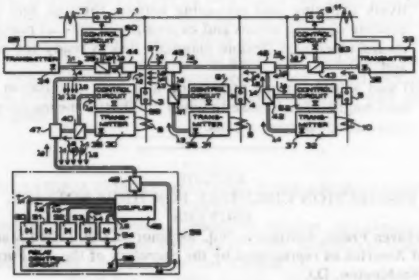
**Yasuhiro Uekubo, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 1, 1982, Ser. No. 445,846**

**Claims priority, application Japan, Dec. 2, 1981, 56-196163**

**Int. Cl.³ H02H *3/36***

**U.S. Cl. 361—64** **3 Claims**



1. A protective relay system which supervises a power system based upon electric information detected from each of the portions of the power system that is to be protected, and which protects said power system in case it is detected that a line fault occurs in the power system, said protective relay system comprising:

a plurality of transmission means for sending the detected electric information into a transmission path by converting it into light signals having their inherent wavelength;

a plurality of control means which receives light signals having their inherent wavelengths from said transmission path, and which actuate circuit breaker corresponding to said transmission means responsive to instruction transmitted in the form of light signals;

a protection circuit means which is connected to said transmission means and said control means via the transmission path, which receives light signals from said transmission means to obtain electric information, and which, when abnormal condition is detected in the information through a predetermined process, sends instruction in the form of a light signal having its inherent wavelength to the transmission means which is detected to be a fault phenomenon, the instruction being sent over said transmission path;

said protection circuit means comprising a first coupler which permits light signals having their inherent wavelengths to pass from said transmission path to the individual transmission means, and which sends a light signal having an inherent wavelength that serves as instruction to said transmission path;

a second coupler having a multiple of ports to branch the signals, and which branches light signals introduced via said first coupler;

a plurality of light-receiving demodulators which introduce light signals sent from the branching ports of said second coupler, and which demodulate them into electric information;

a relay control circuit means which receives information from said demodulators, and which, when the line fault is detected from the information through a predetermined process, sends instruction to the corresponding control means, said instruction being sent in the form of light signal having its inherent wavelength over said transmission path via said first coupler; and

optical fibers which connect said transmission means, said control means, and said protection circuit means, and which transmit said light signals.

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**4,517,620**

## ELECTRICAL FEED AND CONTROL CIRCUIT FOR THE PUMP PISTON OF A SPRAY GUN

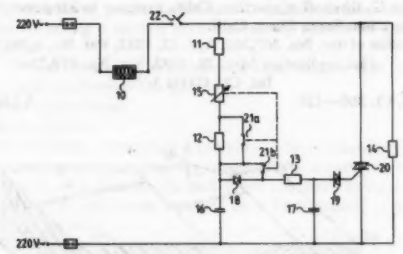
**Hans-Joachim Boll, Markdorf, Fed. Rep. of Germany, assignor to J. Wagner GmbH, Fed. Rep. of Germany**

**Filed Sep. 23, 1982, Ser. No. 422,281**

**Claims priority, application Fed. Rep. of Germany, Oct. 6, 1981, 3139724**

**Int. Cl.³ H01H *47/32***

**U.S. Cl. 361—154** **11 Claims**




1. In an electrical feed and control circuit for a drive arrangement, including a coil and an oscillating armature, of a pump piston of a spray gun in which control circuit an input is provided for connection to an alternating current source, and output means is connected to the coil, a half-wave suppressor is selectively connectible to the output means by way of a two-position switch device, and a phase-angle control consti-

tuting a first phase-angle control is connectible and disconnectible by way of the switch device, the first phase-angle control comprising a timing element including a fixed resistor and a capacitor, the improvement comprising:

a second phase-angle control including an additional timing element comprising a variable resistor and the capacitor of the first phase-angle control;

said second phase-angle control connected to the switch device connected in a first switch position in a current path to the output means bypassing the half-wave suppressor and in a second switch position in a current path to the output means through the first phase-angle control and the half-wave suppressor.

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**4,517,621**

## CIRCUIT ARRANGEMENT FOR THE PRODUCTION OF A QUASI-ELECTROSTATIC FIELD

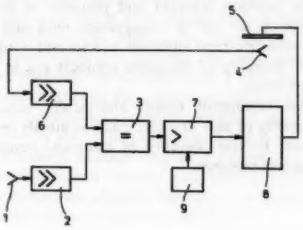
**Otto Brusis, Mühleher 13, 7744 Königsfeld; Sigurd Maiter, Bismarckring 38, 7900 Ulm, and Paul Haufe, Südring 10, 8878 Bibertal-Anhofen, all of Fed. Rep. of Germany**

**Filed Sep. 23, 1982, Ser. No. 421,784**

**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1982, 3229821**

**Int. Cl.³ H01T** *20/02*

**U.S. Cl. 361—231** **11 Claims**



1. A circuit arrangement for the production of a quasi-electrostatic field for climatological and/or therapeutical applications which comprises a high-voltage generator circuit whose output voltage is applied to an electrode arranged inside the room to be air-conditioned, comprising in combination:

(a) an internal probe for the detection of the effective electric field within the range of action of the electrode,

(b) a comparator which compares the output signal emitted by the internal probe with a reference voltage which is representative of a desired field within the range of action of the electrode, and which voltage is derived from an external probe which is arranged outside the room to be air-conditioned and detects the natural field of the external atmosphere, and

(c) a control amplifier to which the output signal emitted by the comparator is fed and whose output signal modulates the high voltage generator circuit.

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**4,517,622**

## CAPACITIVE PRESSURE TRANSDUCER SIGNAL CONDITIONING CIRCUIT

**Barry Male, Windsor Locks, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

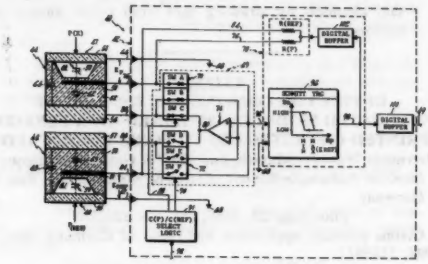
**Filed Aug. 29, 1983, Ser. No. 527,530**

**Int. Cl.³ H01G** *7/00, 9/16;* **G01L** *9/12*

**U.S. Cl. 361—283** **6 Claims**

1. Apparatus, responsive to a capacitive pressure transducer's indication of pressure magnitude as the instantaneous value of a pressure responsive capacitance associated with the central electrode-to-diaphragm junction of the transducer in combination with the value of the nonpressure responsive capacitance associated with the central electrode-to-substrate junction of the transducer, for providing a signal indication of the instantaneous value of the pressure responsive capacitance, comprising:

conversion means, connected at an input and output thereof for regenerative response to the transducer's central electrode-to-diaphragm junction, for providing thereto an output bistable current signal having alternate high current and low current states in dependence on the alternately increasing and decreasing amplitude of an actual voltage integral signal provided by the pressure responsive capacitance in response to said bistable current signal, said integral signal having an amplitude rate of change dependent on the instantaneous value of said pressure



responsive capacitance, said conversion means providing as said signal indication of the instantaneous value of the pressure responsive capacitance the frequency at which said bistable signal alternates between said high and low signal states; and

signal coupling means, responsive to said conversion means bistable current signal for providing an equivalent voltage integral signal to the transducer's substrate-to-diaphragm junction, whereby said central electrode-to-substrate junction nonpressure responsive capacitance is presented with a zero voltage potential thereacross to provide a zero integral response.

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**4,517,623**

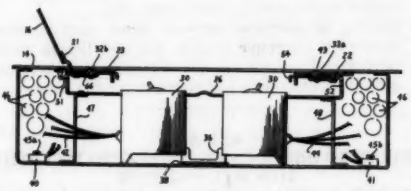
## CONCEALED-FASTENER PANELBOARD FRONT AND CLAMPING LATCHES

**Gregory P. Barner, Atlanta, and Drew S. Hancock, Marietta, both of Ga., assignors to Siemens-Allis, Inc., Atlanta, Ga.**

**Filed Sep. 30, 1983, Ser. No. 537,707**

**Int. Cl.³ H02B** *1/04*

**U.S. Cl. 361—358** **12 Claims**



1. In a panelboard including a generally rectangular enclosure having a back portion and side portions terminating in flanges defining an open front of said enclosure and having bus means disposed therein for connection to a plurality of circuit breakers,

an interior panel disposed within said enclosure and defining openings through which portions of the circuit breakers may protrude;

mounting means fixedly securing said interior panel within said enclosure generally parallel to the open front thereof;

said interior panel terminating in generally C-shaped channels at opposite edges thereof, said channels extending outwardly from the central section and including means for engaging a clamp;

a front cover for the enclosure including a generally rectangular trim plate having an outer periphery extending at least to the side portions of the enclosure; an opening disposed generally in the center of said trim plate; a door fitting into said opening; rabbets disposed at opposite sides of the opening and extending toward one another past the channels of said interior panel; and clamp means rotatably attached to the rear sides of said rabbets to lie between said channels, said clamp means having arms engaging said channels for drawing said front cover against the enclosure.

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**4,517,624**

## DEVICE FOR COOLING A PLURALITY OF INTEGRATED MODULES COMBINED ON A FLEXIBLE PRINTED CIRCUITBOARD TO FORM LOGIC CARDS

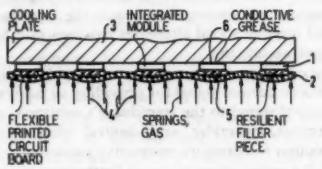
**Herrmann Wessely, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Aug. 25, 1983, Ser. No. 526,370**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1982, 3233522**

**Int. Cl.³ H05K** *7/20*

**U.S. Cl. 361—387** **7 Claims**




1. A device which cools a plurality of integrated modules, comprising:

a plurality of integrated modules each including a rear surface;

a flexible printed circuitboard supporting said plurality of integrated modules;

a common cooling plate including a highly planar surface engaging said rear surfaces;

common pressure means acting on said flexible printed circuitboard to press the circuitboard and said modules toward said common cooling plate; and

a plurality of individual pressure means each interposed between a respective module and said flexible printed circuitboard and pressing the respective module towards and into contact with said common cooling plate.

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**4,517,625**

## CIRCUIT BOARD HOUSING WITH ZERO INSERTION FORCE CONNECTOR

**Attila Frink, Northridge, and Robert A. Morrison, Long Beach, both of Calif., assignors to Lockheed Corporation, Burbank, Calif.**

**Filed Nov. 9, 1983, Ser. No. 549,941**

**Int. Cl.³ H01R** *9/09*

**U.S. Cl. 361—399** **4 Claims**

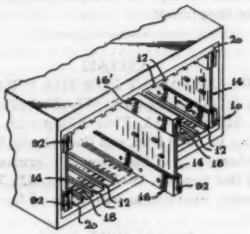
1. A circuit board housing for electrically coupling at least one circuit board to a mother board mounted within said housing, said circuit board having a plurality of first electrical terminals mounted along at least one edge portion thereof, the housing comprising:

said housing having at least one zero insertion force socket, said at least one socket having a plurality of second electrical terminals mounted therein;

an electrical connector comprising:

a circuit board support member slideably engageable with at least one said socket, said support member having clamping means mounted thereto adapted to releaseably engage said edge portion of said circuit board;

a resilient member rotatably mounted in said support member having a plurality of first electrical contacts



mounted thereon, said resilient member rotatable from a first position wherein said plurality of first electrical contacts are out of engagement with said plurality of second electrical terminals to a second position wherein said plurality of electrical contacts are in engagement therewith;

flexible conductor means electrically connecting said plurality of said first electrical terminals on said circuit board to said plurality of electrical contacts on said resilient member.

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**4,517,626**

## SOLID ELECTROLYTE CAPACITOR ANODE ASSEMBLY

**Michael D. Allen, Alfred, and John E. Van Voorhis, Waterboro, both of Me., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Sep. 24, 1982, Ser. No. 422,808**

**Int. Cl.³ H01G** *9/00*

**U.S. Cl. 361—433** **5 Claims**

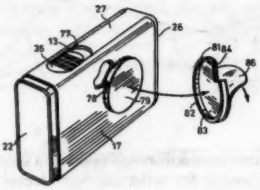
1. A low capacitance solid electrolyte capacitor anode assembly comprising an anode of a stub of valve-metal wire as a non-porous solid body portion and a substantially smaller diameter valve-metal wire as a riser portion directly attached to the center of an end surface of said body portion.

4,517,627

## SPOT LIGHT FOR HANDBAG AND LIKE RECEPTACLES

Herbert G. Bradford, 290 Silverstone Dr., Apt. 93, Rexdale, Ontario M9V 3J4, Canada

Filed Jun. 15, 1984, Ser. No. 621,116
Int. Cl.[3] A45C *14/06*
U.S. Cl. 362—156 9 Claims



1. A spot light for illuminating the interior of a handbag or like receptacle, comprising a housing having opaque end walls, edge walls and side walls, a single dry cell received in the housing between the end walls and the alongside one edge wall, an opening in one end wall adjacent the edge wall opposite the dry cell, a reflector located in, and forming a bulb-receiving recess in, said opening, a single light bulb secured in the reflector to direct a narrow spot of light from the opening, switch means operable from outside the housing to connect and disconnect said single dry cell and the bulb, and pivot means on one of the side walls, comprising a circular socket and a circular disc nested in the socket and magnetically attracted into frictional contact therewith, whereby the housing is pivotable arcuately about the pivot means and is supported thereby stably in a range of stable angular positions, one of the socket and disc being on said one side wall, and the other of the socket and disc having an adhesive backing for adhering it to the interior of a handbag or like receptacle.

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4,517,628

## PORTABLE LIGHTING DEVICE

Kevin McDermott, 196 Phillips Dr., Hampstead, Md. 21074

Filed Oct. 31, 1983, Ser. No. 547,391
Int. Cl.[3] F21L *7/00*
U.S. Cl. 362—186 24 Claims

1. A portable lighting device in the form of a penlight having an elongated open-ended cylindrical tube of electrically conductive material, containing therein at least one dry battery power cell, a plug assembly arranged so as to close a first end of said tube, and a lamp and color filter mechanism arranged so as to close a second end of said tube and to emit light along the longitudinal axis of said penlight, wherein the improvements comprise:

(a) a multiplicity of apertures punched through the wall of said tube in proximity to said first end for the detachable assembly therein of a pocket clip jointly with said plug assembly;

(b) means for producing bidirectional applied forces along said longitudinal axis of said penlight;

(c) means for resolving said longitudinal forces into oblique forces for jointly maintaining low contact resistances yielding reliable continuity of an electrical circuit encompassing a filament of said lamp and filter mechanism;

(d) means, responsive to manual control, for overcoming said oblique forces thereby breaking the continuity of said electrical circuit, causing said lamp filament to cease its emission of light;

(e) means, responsive to a rotational manual control about said longitudinal axis, for emitting a collimated light beam as thereby selected from among a multiplicity of different colors; and

(f) a ring, integrated with said plug assembly in a longitudinal plane through said penlight, for attachment of a lanyard.

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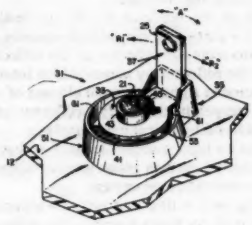
4,517,629

## MOTOR VEHICLE HEADLIGHT WITH ADHESIVE ACCUMULATION MEANS

Kenneth E. Alexander, and Robert J. Marshall, both of Seymour, Ind., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jan. 19, 1983, Ser. No. 459,272
Int. Cl.[3] F21V *31/02*
U.S. Cl. 362—267 5 Claims



1. A motor vehicle headlight comprising:

a plastic reflector having a curved rear portion having at least one opening therein, and a forward open end portion;

a lens member secured to said open end portion of said reflector to provide a closure therefor;

an electrical lamp disposed within said reflector and including a glass envelope, at least two lead-in wires projecting from said envelope, and at least two support wires, each of said wires being fixedly secured to a respective one of said lead-in wires and passing through said rear portion of said plastic reflector, at least one of said wires being positioned within said opening within said rear portion;

terminal means for being electrically connected to said support wire positioned within said opening, said terminal means including a metallic eyelet located within said opening and substantially surrounding said support wire within said opening, and a metallic lug member including a base segment and an upstanding leg segment, said eyelet being secured to said base segment of said lug;

a quantity of adhesive located within said opening and surrounding said eyelet, said curved rear portion of said reflector including an upstanding portion located on an external surface of said reflector and about said opening having said eyelet, support wire, and adhesive therein, said upstanding portion defining a reservoir therein relative to said opening for accommodating excessive amounts of adhesive which may occur during assembly of said headlight, said reservoir comprising a substantially annular groove formed within said upstanding portion of

said reflector and substantially surrounding said opening within said reflector.

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**4,517,630**

## MOTOR VEHICLE HEADLIGHT WITH CONDENSING LENS AND DIAPHRAGM

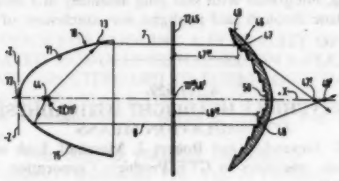
**Rüdiger Dieffenbach; Werner Grünwald, both of Gerlingen; Peter Perthus, and Friedrich Prinzhausen, both of Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Nov. 30, 1982, Ser. No. 445,430**

**Claims priority, application Fed. Rep. of Germany, Dec. 8, 1981, 3148432; Jul. 16, 1982, 3226580**

**Int. Cl.³ F21V** *5/00*

**U.S. Cl. 362—268** **11 Claims**



1. Headlight for a motor vehicle having a filamentary light source and a reflector, wherein;

the section of the reflector by the vertical median plane thereof is a part of an ellipse and contains a reflector axis which intersects the reflector at the reflector vertex;

sections of the reflector by planes which intersect the axis of the reflector at right angles are ellipses of which the half-axes are perpendicular to the reflector axis and one of them lies in said vertical median plane;

said filamentary light source is located at that one of the foci of said vertical median plane section ellipse which is the nearer to said reflector vertex;

a condensing lens is disposed with its axis on the reflector axis and with its focus towards the reflector coincident with the focus of said ellipse which is the farther from said reflector vertex;

a diaphragm located in the region of the reflector axis is disposed in the focal plane of said condensing lens nearer said reflector; and

the optically effective edge of said diaphragm lies in the neighborhood of said focus of said lens towards said reflector,

the section of the reflector by the horizontal median plane thereof being parabolic,

different radial zones of said condensing lens respectively having different focal lengths, diminishing in magnitude toward the lens rim, while all said zones have a common focus which is said focus coincident with said reflector focus farther from said reflector vertex,

said condensing lens being constituted as a meniscal Fresnel lens having a convex surface facing away from said reflector and a stepped concave surface facing towards said reflector.

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**4,517,631**

## INDIRECT LIGHT REFLECTOR

**Jack R. Mullins, Missouri City, Tex., assignor to J. W. Lighting Inc., Houston, Tex.**

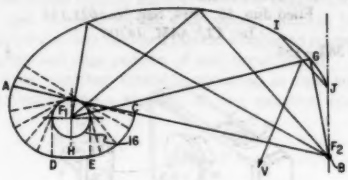
**Filed May 14, 1984, Ser. No. 610,019**

**Int. Cl.³ F21V** *7/00*

**U.S. Cl. 362—346** **17 Claims**

1. A reflector for use with a light source comprising:

first reflector means having first and second focal points, said light source located at said first focal point, a first surface thereof being opposite said first reflector, for reflecting light originating near said first focal point through said second focal point; and



second reflector means disposed opposite a second surface of said light source for reflecting light received from said second surface around said light source and on to said first reflector means for further reflection therefrom.

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**4,517,632**

## OPERATING THEATRE LAMP

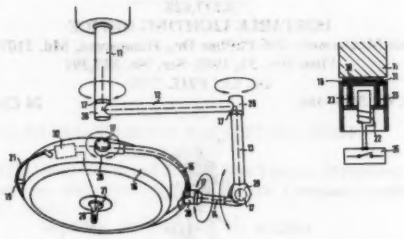
**Eberhard Roos, Tuttlingen, Fed. Rep. of Germany, assignor to Delma- elektro- und medizinische Apparatebau Gesellschaft mbH, Tuttlingen, Fed. Rep. of Germany**

**Filed Nov. 17, 1983, Ser. No. 552,646**

**Claims priority, application Fed. Rep. of Germany, Nov. 25, 1982, 3243709**

**Int. Cl.³ F21V** *21/28;* **B60T** *13/04;* **F16D** *65/34*

**U.S. Cl. 362—389** **9 Claims**



1. An articulated operating theatre lamp of the type mounted to a support comprising:

a lamp unit having a grasping surface; and

an articulated support arm assembly means for mounting said lamp unit from the support, said mounting means including:

a plurality of support arms;

pivot joints for joining said support arms to one another;

means for normally locking said pivot joints to inhibit relative movement of said support arms joined by respective ones of said pivot joints; and

means for simultaneously electrically releasing said locking means in response to a user touching said grasping surface to allow said pivot joint means to freely pivot during a period said grasping surface is being touched by the user so said lamp unit is movable to a desired position during such period and so said lamp unit is inhibited from movement by said locking means otherwise.

## 4,517,633
## SWITCHED MODE POWER SUPPLY WITH A PLURALITY OF REGULATED SECONDARY OUTLETS

**Domenic Melcher, Acherstrasse 56, CH-8610 Uster, Switzerland**

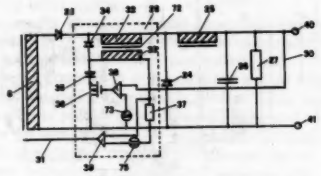
**PCT No. PCT/CH82/00102, § 371 Date May 3, 1983, § 102(e) Date May 3, 1983, PCT Pub. No. WO83/00964, PCT Pub. Date Mar. 17, 1983**

**PCT Filed Aug. 30, 1982, Ser. No. 499,766**

**Claims priority, application Switzerland, Sep. 5, 1981, 5695/81**

**Int. Cl.³ H02M** *3/335*

**U.S. Cl. 363—21** **8 Claims**



1. Switched mode power supply with at least one regulated secondary circuit characterized in

that it is comprising a regulation circuit (**28**) in every one of the secondary circuits, which regulation circuit (**28**) is comprising each at least the following elements: a transformer (**72**), two diodes (**34,35**), a switching element (**36**), a comparator circuit (**38**) with reference source (**73**) and means for pulse-width modulation,

which is further characterised in that the primary coil (**32**) of the transformer (**72**) in the main current path is connected in series to a rectifier diode (**23**) of the secondary circuit,

that one end of the secondary coil (**33**) of the transformer (**72**) is connected to the primary coil (**32**) and the diode (**23**) via the diode (**34**),

that the one end of the diode (**35**) is also connected with the said end of the secondary coil (**33**) whereas the other end of the diode (**35**) is connected to one current port of the switching element (**36**),

that the other current port of the switching element (**36**) is connected to the same lead as the other end of the secondary coil (**33**) to which lead is connected also the output connector (**41**),

that one entrance of the comparator (**38**) is connected directly to the other output connector (**40**), the other entrance of comparator circuit (**38**) is connected to the output connector (**41**) via the reference source (**73**), whereas its outlet is connected to the signal port of the switching element (**36**).

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## 4,517,634
## POWER CONVERSION EQUIPMENT

**Takami Sakai, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Dec. 15, 1982, Ser. No. 450,010**

**Claims priority, application Japan, Dec. 26, 1981, 56-213011**

**Int. Cl.³ H02J** *3/36*

**U.S. Cl. 363—35** **4 Claims**

1. Power conversion equipment for converting electric power which is transmitted in a power system, comprising:

means for detecting the electric power transmitted in said power system;

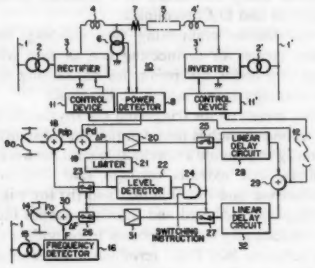
a power setter for presetting a value of electric power of said power system;

means for calculating a difference between the detected electric power and the preset value of electric power and for producing a corresponding output;

mode changeover means for changing over an operation mode of said power system between a power control mode and a frequency control mode in response to said output of said difference calculating means;

power control means for controlling the electric power of said power system when the operation mode of said power system is changed over to the power control mode;

frequency control means for controlling a frequency of said power system when the operation mode of said power system is changed over to the frequency control mode;



means for driving said mode changeover means such that said mode changeover means changes said operation from said frequency control mode to said power control mode only when the said output of said calculating means is below a predetermined value; and

said power setter being operated to adjust the present value of electric power so as to eliminate said calculated difference in said frequency control mode.

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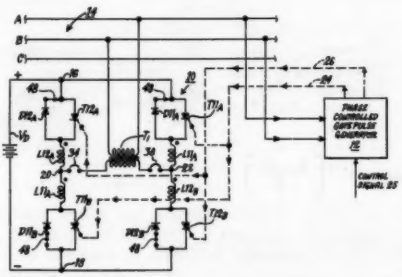
## 4,517,635
## LINE-COMMUTATED CONVERTER CIRCUIT

**Fred W. Kelley, Jr., Media, Pa., assignor to General Electric Company, King of Prussia, Pa.**

**Filed Sep. 24, 1982, Ser. No. 423,481**

**Int. Cl.³ H02M** *7/757*

**U.S. Cl. 363—136** **13 Claims**



1. In a line-commutated converter circuit that: (i) normally operates with a power factor exceeding 0.3 when operating near full inversion or near full rectification, (ii) has two D.C. terminals, one positive and one negative, adapted to be connected to a D.C. system, (iii) has a pair of A.C. terminals adapted to be connected to an A.C. system, and (iv) during normal operating conditions has coupled between two predetermined nodes a normalized peak value $\overline{V}$ of the A.C. system voltage in the range of 1.85 to 3.5;

(a) first, second, third, and fourth branches, each branch comprising the combination of a thyristor and a diode connected in inverse-parallel relationship and an inductor connected in series with the thyristor-diode combination; the first and third branches being connected to said posi-

tive D.C. terminal, and the second and fourth branches being connected to said negative D.C. terminal;

(b) means for connecting said first and fourth branches in series across said D.C. terminals, with a first of said predetermined nodes located between said first and fourth branches, and means for connecting said second and third branches in series across said D.C. terminals, with a second of said predetermined nodes located between said second and third branches; the diodes of said four branches being connected in a blocking direction with respect to said D.C. terminals;

(c) a transformer comprising two windings coupled together, means for connecting one of said windings between said nodes and means for connecting the other of said windings across said A.C. terminals;

(d) gating means (i) for triggering the thyristors of said first and second branches into conduction substantially simultaneously to provide a conductive path between said D.C. terminals that extends through said first and second branches via said one winding and (ii) for triggering the thyristors of said third and fourth branches into conduction substantially simultaneously to provide a conductive path between said D.C. terminals that extends through said third and fourth branches via said one winding;

(e) and means for controlling said gating means such that the thyristors of said first and second branches are triggered into conduction at a controlled phase angle with respect to the A.C. system voltage thereafter;

(f) said triggering normally being repeated each cycle of the A.C. system voltage;

(g) said means for controlling the gating means being adjustable over a range that provides for smooth adjustment through zero of the magnitude of the power flow between said A.C. and D.C. systems and for smooth reversal in the direction of said power flow between said A.C. and D.C. systems,

(h) the phase angle $\phi$ of the triggering of the thyristors normally being confined to the following limits between a maximum value $\phi_{(max)}$ and a minimum value $\phi_{(min)}$:

$$\phi_{(max)} = \sin^{-1}\left[\frac{2-C}{C\,\overline{V}}\right]$$

$$\phi_{(min)} = \frac{C\,\pi}{2-C} - \frac{C\,\overline{V}}{2-C}\cos\phi_{(min)} - \cdot\sin^{-1}\left(\frac{2-C}{C\,\overline{V}}\right) - \left[\left(\frac{C\,\overline{V}}{2-C}\right)^2 - 1\right]^{\frac{1}{2}}$$

if $2\,\overline{V}\cos\phi_{(min)} - \pi < 0$; and

$$\phi_{(min)} = \frac{C\,\pi}{2(2-C)} - \frac{C\,\overline{V}}{2-C}\cos\phi_{(min)} - \cos^{-1}\frac{\pi}{2\,\overline{V}}$$

if $2\,\overline{V}\cos\phi_{(min)} - \pi > 0$,

where C is the ratio of the inductance of the branches of the converter in a conductive path to the total inductive path inductance.

**4,517,636**

## INVERTER APPARATUS

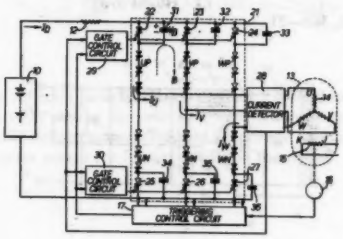
**Hiroshi Uchino, Hachiouji; Kihei Nakajima, Yokohama, and Ryoichi Kurosawa, Hachiouji, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Jul. 8, 1983, Ser. No. 512,004**

**Claims priority, application Japan, Jul. 9, 1982, 57-119522; Jul. 9, 1982, 57-119523**

**Int. Cl.³ H02M 7/515**

**U.S. Cl. 363—138** **3 Claims**



1. A D.C. to A.C. inverter apparatus responsive to a D.C. power source comprising:

an inverter including thyristor-branches, said inverter being connected across the DC power source;

a plurality of gate-turn-off thyristors respectively interposed between the DC power source and each of the thyristor-branches;

a load connected to the output terminals of said inverter;

gate control means for applying gate turn-off signals to said gate-turn-off thyristors;

means for detecting current through the output terminals of said inverter and applying control signals to said gate control means when the detected current is a predetermined value; and

means for biasing a reverse voltage to the thyristor-branches when said gate-turn-off thyristor is turned off.

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**4,517,637**

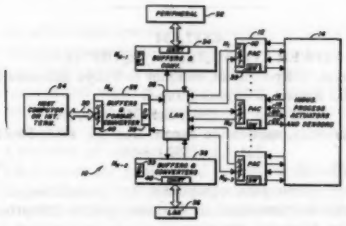
## DISTRIBUTED MEASUREMENT AND CONTROL SYSTEM FOR INDUSTRIAL PROCESSES

**Douglas A. Cassell, Sherborn, Mass., assignor to Inconix Corporation, Natick, Mass.**

**Filed Apr. 21, 1983, Ser. No. 487,041**

**Int. Cl.³ G06F 15/46**

**U.S. Cl. 364—138** **12 Claims**



1. A distributed measurement and control system for industrial processes having a plurality of industrial sensors and industrial controllers, comprising:

a host system;

a local area network coupled to said host system;

at least one programmable industrial measurement and control device coupled to said local area network;

said at least one industrial measurement and control device including;

a processor having a program ROM and a scratch pad RAM;

first means coupled to said processor for providing a plurality of analog input channels for receiving a like plurality of input signals from individual ones of said industrial sensors;

second means coupled to said analog input channels and to said processor for selectively conditioning said plurality of analog input signals;

third means coupled to said processor and to said second means for repetitively providing digital data representative of corresponding ones of said selectively conditioned analog input signals;

fourth means coupled to said processor for providing a plurality of output signal channels connectable to individual ones of said industrial controllers; and

fifth means coupled to said processor and to said third and fourth means for repetitively evaluating at least one of a plurality of predetermined measurement and control functions on said data and for actuating in accordance therewith preselected ones of said output signals, said fifth means including a plurality of RAM working registers, a pointer controlled ROM work list for defining the time sequence of functions to be evaluated, a ROM directory table for defining the starting addresses for the control and data structures for each of the functions to be evaluated, a ROM variables control block having for each starting address specified therefor by the directory a table defining RAM addresses for the data structure to be loaded into the RAM working registers for evaluation, a ROM output control block having for each starting address specified therefor by the directory a table defining the RAM addresses for the data and control structures for the RAM working registers after function evaluation, and a ROM program code table having for each starting address specified therefor by the directory a table of instructions in microcode defining individual ones of said at least one of said plurality of predetermined functions to be evaluated.

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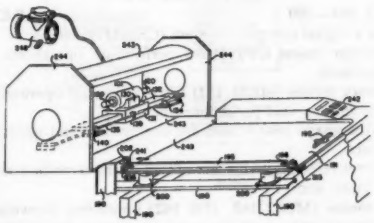
**4,517,638**

## APPARATUS AND METHOD OF MICROPROCESSOR-CONTROLLING LASER SCANNING OF A MATERIAL HELD BY A TRANSPORT, THE LOADING AND UNLOADING OF THE TRANSPORT ALSO BEING MICROPROCESSOR-CONTROLLED

**Zvi Provisor, Fairfax, and Henry H. T. Burford, Jr., Annandale, both of Va., assignors to Crosfield Data Systems, Inc., Springfield, Va.**

**Filed Jun. 16, 1982, Ser. No. 388,813**
**Int. Cl.³ G06F *15/46*; H04N *1/06***
**U.S. Cl. 364—146** **32 Claims**



1. A system for controlling a scanner apparatus for (a) scanning, with an optical reading device which rotates about and translates along an axis, an image on an image-carrying element supported by a transport, (b) converting an optical signal from the optical reading device into a electrical signal which is stored in at least one memory as digital data, (c) clocking out said digital data from the memory, and (d) generating an optical signal from the digital data with an optical writer device which (i) rotates about and translates along an axis and (ii) scans an image receiving medium supported by a transport to write an image on the medium, the reading device and writing device operating independently, the control system comprising:

a first microprocessor;

a control panel having actuatable buttons and keys thereon, each button of which, when actuated, provides a corresponding control-related input to the first microprocessor and each key of which represents a data input;

means for interfacing the control panel to the first microprocessor;

wherein one button comprises a format button which, when actuated by an operator, permits the operator to selectively actuate at least one key which represents a corresponding image size on the medium, the selective key actuations being directed to the first microprocessor through the interfacing means to provide inputs to the apparatus which (a) control the clocking rate of digital data from the memory to effect vertical image size and (b) control the rate of translation of the optical writer device.

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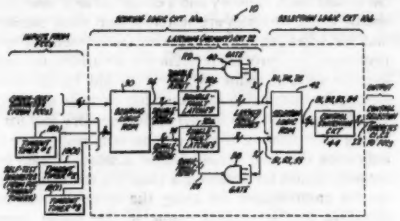
**4,517,639**

## FAULT SCORING AND SELECTION CIRCUIT AND METHOD FOR REDUNDANT SYSTEM

**Philip J. Ferrell, Seattle; Alan D. Stern, Bellevue, and Melvin D. McFarland, Pacific, all of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed May 13, 1982, Ser. No. 377,854**
**Int. Cl.³ G06F *11/16***
**U.S. Cl. 364—186** **25 Claims**



1. A fault scoring and selection circuit for selectively enabling at least one of a plurality of redundant control units to govern the operation of controlled equipment in which the redundant control units are each of the type having both self-testing and cross-testing capabilities respectively producing self-test and cross-test fault signals, said circuit comprising:

fault-scoring logic circuit means including means for receiving self-test and cross-test fault signals from each of said control units, and means assigning predetermined scoring weights, certain of which are different, to said self-test fault signals and cross-test fault signals, and means for combining these weighted fault signals to produce combined fault score signals representing the health of each of said control units; and

selection logic circuit means for receiving said fault score signals, and for converting said fault score signals into a selection output signal that selects at least one of said control units having the lowest available fault score as determined by said fault score signals.

**4,517,640**

## STACK MACHINE WITH IMPROVED CACHE MEMORY FOR VARIABLES

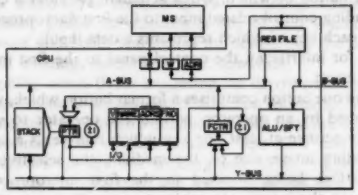
**Akira Hattori, Yokohama; Hiromu Hayashi, Zama; Akio Shinagawa, and Tsuyoshi Shinogi, both of Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Jun. 30, 1982, Ser. No. 393,533**

**Claims priority, application Japan, Jun. 30, 1981, 56-102900; Jul. 3, 1981, 56-104017; Jul. 3, 1981, 56-104020**

**Int. Cl.³ G06F *13/00***

**U.S. Cl. 364—200** **7 Claims**




1. A data processing system having a program structure and execution mode where an actual argument is bound to a formal argument of a function to be called by storing a pair of a variable name as the formal argument and a variable as the actual argument into a First-In-Last-Out stack memory as an environment list, the function called executes processings using a latest bind value from said environment list when referring to variable values, when a value of such function is obtained, said function value is returned by deleting the formal argument variable of the function from said environment list, said system comprising:

counter means for incrementing one and decrementing one for each call and return of the function, respectively;

associative buffer memory means, operatively connected to said counter means, for storing words where each word comprises the variable name, location data for the variable name, location data for the variable on the environment list of said stack memory and a count value of said counter means when variables are stored in said stack memory;

means for accessing said associative buffer memory means, responsive to a process reference to a variable for supplying the variable name as a key to said buffer memory means, for comparing said supplied variable name to the variable names stored in said buffer memory and for providing an indication of said comparison, responsive to an indication that said variable name is stored in said buffer memory means for obtaining a value for the variable name on the environment list using the location data corresponding to the variable name in the buffer memory means, responsive to an indication that said variable name is not stored in said buffer memory for obtaining a value for the variable name by searching variable names stored on said environment list and, responsive to a return from the function called for deleting the word of the buffer memory means which contains said counter value for said function.

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**4,517,641**

## LOOKAHEAD I/O DEVICE CONTROL SUBSYSTEM

**Edwin J. Pinheiro, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 30, 1982, Ser. No. 373,366**

**Int. Cl.³ G06F *3/04***

**U.S. Cl. 364—200** **9 Claims**

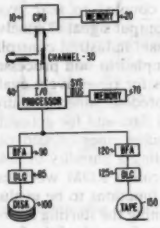
1. An I/O device control subsystem for providing a command for execution by a first I/O device in an idle mode after providing a previous command for a data transfer by a second I/O device which is still busy with said data transfer, the data transfer rate of said first I/O device being greater than the data transfer rate of said second I/O device, the improvement comprising:

means coupled to the first I/O device for determining the time required for execution of said command by said first I/O device;

means coupled to the second I/O device for providing a time indication of the time at which said second I/O device will complete said data transfer;

means for indicating current time;

means coupled to the current time indicating means and the command execution time means for combining said command execution time with said current time to provide a command execution completion time; and




means coupled to the command execution completion time means, the current time indicating means, the first I/O device, and the second I/O device data transfer completion time means for comparing said command execution completion time with said time indication of the time at which said second I/O device will complete said data transfer and enabling execution of the command by said first I/O device if said execution completion time is less than said time indication and if execution of the command does not interfere with the data transfer by the second I/O device.

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**4,517,642**

## DIGITAL COMPUTER SYSTEM HAVING UNIQUE MEANS OF REFERRING TO OPERANDS AND ABILITY TO EXECUTE A PLURALITY OF INTERNAL LANGUAGES

**John K. Ahlstrom, Mountain View, Calif.; David H. Bernstein, Ashland, Mass.; Gerald F. Clancy, Saratoga, Calif.; Ronald H. Gruner; Craig J. Mundie, both of Cary, N.C.; Michael S. Richmond, Pittsboro, N.C.; Stephen I. Schleimer, Chapel Hill, N.C.; Steven J. Wallach, Saratoga, Calif., and Walter A. Wallach, Jr., Raleigh, N.C., assignors to Data General Corporation, Westborough, Mass.**

**Filed May 22, 1981, Ser. No. 266,521**

**Int. Cl.³ G06F *9/40***

**U.S. Cl. 364—200** **9 Claims**

1. In a digital computer system (CS101) including:

processor means (JP114) for performing operations upon operands,

memory means (MEM 112) for storing said operands and procedures, said procedures including:

S-Language instructions for controlling said operations; and,

names referring to certain of said operands to be operated upon, and

bus means (MOD 140, JPB 142) connected between the memory means and the processor means for conducting said instructions, names and operands between said memory means and said processor means;

said processor means comprising:

means for addressing said operands, including:

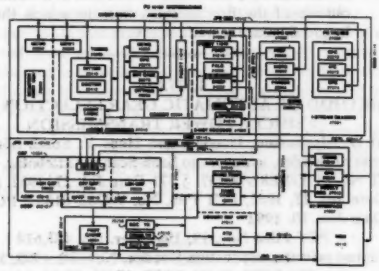
name table means (10350) for storing name table entries, each of said name table entries corresponding to one

of said names included in each one of said procedures and each of said name table entries comprising:

first data from which may be determined an address of a location in said memory means of said operand referred to by one of said names, and

second data identifying a format of said operand referred to by said one of said names; and,

translation means (NAME TRANS UNIT 27015) connected to said bus means and responsive to said name table entries for providing outputs to said memory means representing said addresses in said memory means of said operands referred to by said names,



ALU means (2034, 2074) for performing said operations,

receiving means (INSTB 20262) connected to said bus means for receiving said instructions from said memory means, and

microcode control means (10240, 27003, 27013) connected between said receiving means and said ALU means for providing sequences of microinstructions for controlling said ALU means, said sequences being selected from a plurality of sequences of microinstructions, one sequence corresponding to each of said instructions received by said receiving means.

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**4,517,643**

## INTERRUPT CONTROL APPARATUS FOR A DATA PROCESSING SYSTEM

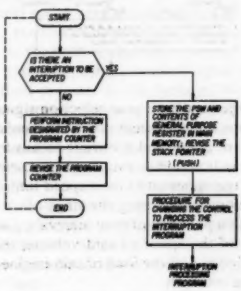
**Akira Bannai, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Mar. 24, 1982, Ser. No. 361,372**

**Claims priority, application Japan, May 29, 1981, 56-80850**

**Int. Cl.³ G06F *9/12***

**U.S. Cl. 364—200** **2 Claims**


START
IS THERE AN INTERRUPTION TO BE ACCEPTED
YES
NO
PERFORM INSTRUCTION DESIGNATED BY THE PROGRAM COUNTER
REVISE THE PROGRAM COUNTER
END
STORE THE PSW AND CONTENTS OF GENERAL PURPOSE REGISTER IN MAIN MEMORY, REVISE THE STACK POINTER (PUSH)
PROCEDURE FOR CHANGING THE CONTROL TO PROCESS THE INTERRUPTION PROGRAM
INTERRUPTION PROCESSING PROGRAM

1. A data processing apparatus, comprising:

a central processing unit having a program counter and a general register;

main memory means electrically connected to said CPU for storing data including a Program Status Word which includes the contents to said program counter and interruption inhibition information and wherein said main memory means stores the contents of said general register;

interruption means for controlling the storage of said data in said main memory when said CPU is processing a main program at the same time a first interruption occurs including a means for conducting a PUSH operation including the storing of the Program Status Word in said main memory;

means for processing a program associated with said first interruption;

means for saving, in an auxiliary memory, said Program Status Word, from said main memory including interruption inhibition information and the contents of said program counter at the time of said first interruption;

means for detecting an enabling second interruption including means for indicating that a second interruption has been made during the processing of said first interruption program and means for determining that the interruption inhibition information in the Program Status Word stored in said auxiliary memory indicates that said second interruption signal is enabling, while the CPU control is returning to said main program due to the execution of a return instruction after the processing of said first interruption program wherein said means for detecting outputs a detection signal when said second interruption signal has been made and when said second interruption signal has been made and is enabling;

means for conducting a POP operation during the execution of a return instruction including means for restoring the Program Status Word to the CPU from said auxiliary memory; and

control means responsive to said detection signal for inhibiting the operation of said means for conducting a POP operation and for making the CPU control advance to process a program associated with said second interruption.

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**4,517,644**

## SYMMETRY TYPE LOOP COMMUNICATION SYSTEM

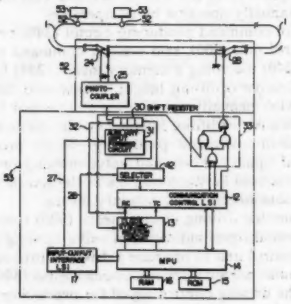
**Nobuhiro Hamada, Hitachiota; Norihiko Sugimoto, Katsuta, and Masumi Nawa, Hitachi, all of Japan, assignors to Hitachi, Ltd. and Hitachi Engineering Co., Ltd., both of Tokyo, Japan**

**Filed Aug. 24, 1981, Ser. No. 295,547**

**Claims priority, application Japan, Sep. 3, 1980, 55-121041**

**Int. Cl.³ G06F *15/16*; H04J *3/08***

**U.S. Cl. 364—200** **12 Claims**




1. A symmetric type loop communication system comprising a loop communication path, and a plurality of communication controlling stations connected in series by said loop communication path, each communication controlling station having means including a delay circuit connected to receive signals from said loop communication path and apply said signals to said communication path for performing a serial delay on said

loop communication path of a bit serial transmission signal carried on said communication path from one station to another, an auxiliary input forming circuit for generating a transmission-right signal to be applied as a bit serial transmission signal on said loop communication path, and control circuit means connected to receive signals from said loop communication path for controlling the operation of said auxiliary input forming circuit to selectively apply said transmission-right signal from said auxiliary input forming circuit to said loop communication path in the absence of receipt of a transmission-right signal from said loop communication path.

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**4,517,645**

## CONTROL DEVICE FOR LOADING AND UNLOADING MECHANISM

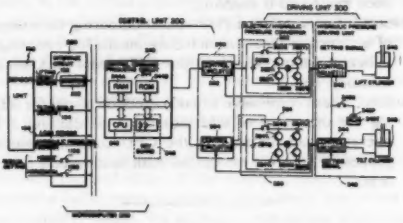
**Katsumi Yuki, Toyota; Susumu Yoshida, Aichi; Mineo Ozeki, Ichinomiya; Yasuyuki Miyazaki, Aichi, and Masaru Kawamata, Numazu, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoh Shokki Seisakusho and Kabushiki Kaisha Meidensha, both of, Japan**

**Filed Mar. 31, 1982, Ser. No. 364,402**

**Claims priority, application Japan, Mar. 31, 1981, 56-47739; Mar. 31, 1981, 56-47743**

**Int. Cl.³ G06F *15/50*; B66F *9/06***

**U.S. Cl. 364—424** **12 Claims**



**1.** In a control device for a loading and unloading mechanism adapted to a fork lift truck comprising:

(a) a sensor unit (**100**) including at least a lifting height sensor means (**102**) for measuring a lifting height of a fork movably mounted on the fork lift truck, and a load sensor means (**106**) for detecting the weight of a load supported by the fork,

(b) a control unit (**200**) comprising an interface circuit including a lifting height counter means (**222**) for counting output signals from the sensor unit, and first data setting means manually operable by an operator,

(c) a control command producing circuit (**240**) provided in the control unit (**200**), said control command producing circuit (**240**) including a memory means (**244**) for storing data indicative of lifting height, and second data setting means (**246**) manually operable by an operator for setting data indicative of lifting height into the memory means, said control command producing circuit producing a command signal indicative of valve opening on the basis of a comparison between outputs of the sensor unit (**100**) and the data stored in the memory means,

(d) a servomotor driving circuit means (**320**) responsive to the command signal indicative of valve opening produced by the control unit to produce a drive control signal, and

(e) a hydraulic pressure driving circuit means (**340**) responsive to the driving control signal for producing a control signal for hydraulically controlling a lift cylinder (**346**),

the improvement wherein

said control command producing circuit comprises storage control means for storing in said memory means data indicative of a predetermined allowable lifting height control range input to the memory means by said second data setting means prior to a loading and unloading operation, and

said storage control means further operable for storing in a first memory area a first lifting height data indicative of a preselected lower value ($H_l$), required for a loading and unloading operation and a second lifting height data indicative of a preselected higher value ($H_h$) required for the same operation in a memory location corresponding to a common address designated by said second data setting means,

wherein said storage control means is further operable for storing in a second memory area storage indication data for confirming storage in said first memory area of data indicative of a lifting height, said second memory area allotted to a predetermined bit or bits of a memory area outside of the first memory area in which the lifting height data are stored.

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**4,517,646**

## METHOD OF AUTOMATIC GEAR SELECTION IN A VEHICLE POWER TRANSMISSION

**Karl G. Magnusson, Handen, and Hans V. Stahl, Södertälje, both of Sweden, assignors to Saab-Scania Aktiebolag, Sweden**

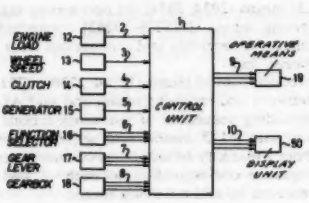
**PCT No. PCT/SE81/00337, § 371 Date Jul. 27, 1982, § 102(e) Date Jul. 27, 1982, PCT Pub. No. WO82/01853, PCT Pub. Date Jun. 10, 1982**

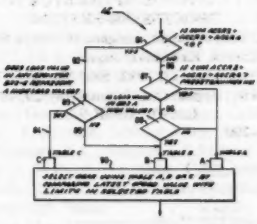
**PCT Filed Nov. 19, 1981, Ser. No. 403,614**

**Claims priority, application Sweden, Nov. 28, 1980, 8008401**

**Int. Cl.³ B60K *20/16*; G05D *17/02*; F16H *5/66***

**U.S. Cl. 364—424.1** **12 Claims**



**1.** A method for generating a gear selection signal in a vehicle having an engine, a mechanical power transmission which includes a plurality of gears, and a storage means for storing a plurality of gear selection tables, each said gear selection table including a respective upper and lower speed limit for each of said gears, said method comprising the steps of:

storing for each of a plurality of time intervals, a set of values representative of the speed of said vehicle, the acceleration of said vehicle, and the load of said engine during the respective time interval;

selecting one of said gear selection tables as a function of said stored values which relate to the engine load and acceleration of said vehicle at least 0.5 seconds before the most recently stored speed value; and

generating a gear selection signal indicative of that gear whose respective upper and lower speed limits, as defined by said selected gear selection table, encompasses the most recently sensed speed value.

7. A method for generating a gear selection signal in a vehicle having an engine, a mechanical power transmission including a plurality of gears, and a storage means for storing a plurality of gear selection tables, each said gear selection table including a respective upper and lower speed limit for each of said gears, said method comprising the steps of:

sensing, during each of a plurality of successive time intervals, a speed value of said vehicle, and a load value of said engine and storing said sensed values;

calculating for each said time interval an acceleration value of said vehicle as a function of said sensed speed value associated with that time interval and said sensed speed value associated with the prior said time interval;

selecting one of said gear selection tables as a function of said stored load and acceleration values which values are associated with at least one of said time intervals which will relate to engine load and vehicle acceleration at least 0.5 seconds before the most recent said time interval; and

generating a gear selection signal indicative of that gear whose respective upper and lower speed limits, as defined by said selected gear selection table, encompasses the most recently sensed speed value.

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**4,517,647**

## MEMORY SYSTEM OF WHEEL SPEED OF VEHICLE WITH SKID CONTROL SYSTEM

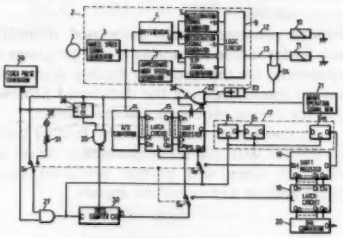
**Atsumu Harada, and Tetsuro Arikawa, both of Kanagawa, Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan**

**Filed Apr. 12, 1982, Ser. No. 367,628**

**Claims priority, application Japan, Apr. 16, 1981, 56-57506**

**Int. Cl.³ B60T** *8/08*

**U.S. Cl. 364—426** **20 Claims**



1. A memory system of wheel speed of a vehicle with skid control system comprising:

(A) a wheel speed sensor associated with the wheel;

(B) a skid control unit measuring the skid condition of said wheel on the basis of the output signal of the wheel speed sensor and generating a control signal for controlling the brake fluid pressure to the brake of the wheel;

(C) a wheel speed signal generator connected to said wheel speed sensor for generating a wheel speed signal having an analogue or digital value proportional to the rotational speed of said wheel;

(D) a memory device for memorizing said wheel speed signal from said wheel speed signal generator;

(E) a switch device arranged between said wheel speed signal generator and said memory device for controlling the transmission of said wheel speed signal to said memory device; and

(F) a brake operation signal generator for generating a brake operation signal when said vehicle is braked, said brake operation signal and said control signal of the skid control unit being supplied to said switch device; and said switch device allowing said wheel speed signal to be transmitted to said memory device when said brake operation signal or said control signal is generated from said brake operation signal generator of said skid control unit.

**4,517,648**

## TORQUE VARIATION DETECTING METHOD AND APPARATUS FOR INTERNAL COMBUSTION ENGINE

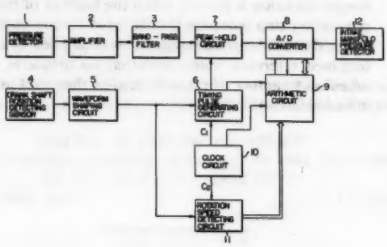
**Toshikazu Ina, Aichi; Hisasi Kawai, Toyohashi; Tokio Kohama, Nishio; Hideki Obayashi, Okazaki; Daisaku Sawada, and Takashi Shigematsu, both of Susono, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Jul. 19, 1982, Ser. No. 399,955**

**Claims priority, application Japan, Jul. 20, 1981, 56-113142**

**Int. Cl.³ G01L** *23/32;* **G01M** *15/00;* **G01P** *15/11*

**U.S. Cl. 364—431.01** **10 Claims**



4. A torque variation detecting method for an internal combustion engine comprising the steps of:

detecting operating conditions of said engine;

detecting a plurality of times within a predetermined constant period, with torque variation detecting means, actual torque variations caused by a combustion variation of said engine;

determining an average value of actual torque variations for at least one of a plurality of sets of said engine operating conditions from a predetermined number of actual torque variations detected during the occurance of said at least one of said sets of engine operating conditions;

determining a deviation between said average value of actual torque variations corresponding to said at least one set of engine operating conditions and an average value of torque variations determined and stored in advance for said at least one set of operating conditions of said engine;

correcting said stored average value of torque variations for said at least one set of engine operating conditions in accordance with said deviation;

comparing the one stored average value corresponding to said detected engine operating conditions with each of the actual torque variations detectd by said torque variation detecting means within said predetermined constant period;

deciding that a reportable torque variation is present when the number of times said comparing step indicates the detected torque variation is larger than the stored average value multiplied by a predetermined constant, is larger than a predetermined reference value, and that no reportable torque variation is present when said number of times is smaller than said predetermined reference value.

10. A torque variation detecting apparatus for an internal combustion engine comprising:

detecting means for detecting the operating conditions of said engine;

torque variation detecting means for detecting a plurality of times within a predetermined constant period actual torque variation caused by a combustion variation of said engine; and

processing means for: (1) calculating an average value of actual torque variations for at least one of a plurality of sets of said operating conditions from a predetermined number of actual torque variations detected during the occurance of said at least one of said sets of engine operating conditions, (2) determining a deviation between said average value of actual torque variations corresponding to

said at least one set of engine operating conditions and an average value of torque variations determined and stored in advance for said at least one set of engine operating conditions of said engine, and (3) correcting said stored average value of torque variations for said at least one set of engine operating conditions in accordance with said deviation, and (4) comparing the one stored average value corresponding to said detected engine operating condition with each of the actual torque variations detected by said torque variation detecting means within said predetermined constant period, and (5) deciding that a reportable torque variation is present when the number of times said comparing step indicates the detected torque variation is larger than the stored average value multiplied by a predetermined reference value, and that no torque is present when said number of times is smaller than said predetermined reference value.

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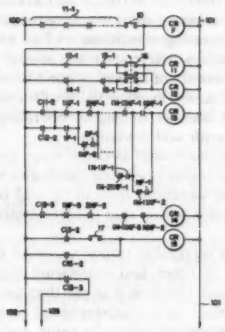
**4,517,649**

## AUTOMATIC DIE-INTERCHANGING CONTROL SYSTEM OF A PRESS MACHINE

**Shinichi Kitagawa, Mikawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed Jun. 23, 1982, Ser. No. 391,178**
**Int. Cl.³ G06F *15/46***
**U.S. Cl. 364—472** **8 Claims**



1. An automatic die-interchanging control system for a press machine having a used-die-demounting step including steps 1 to N for demounting a used die from the press machine, a bolster driving step for transferring a bolster carrying a new die to be mounted on the press machine, and a new-die-mounting step including steps NX to 1X respectively corresponding to the steps N to 1 of said used-die-demounting step, wherein said automatic die-interchanging control system comprises:

judging means which outputs a signal under the condition that no unfinished steps exist before a last finished step among those which have finished their operations; and

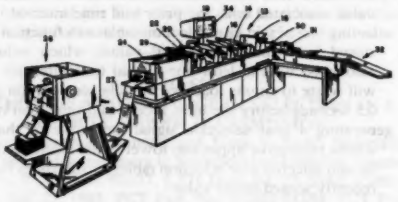
automatic die-interchanging control means for resuming the operation from a step immediately subsequent to said last finished step as an initial step in response to said signal from said judging means.

**4,517,650**

## FEEDER INTERFACE CIRCUIT FOR UNIVERSAL MULTI-STATION DOCUMENT INSERTER

**John M. Gomes, Bridgeport, and Peter N. Piotroski, New Canaan, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Jul. 1, 1982, Ser. No. 394,383**
**Int. Cl.³ G06F *15/20*; G06G *7/48***
**U.S. Cl. 364—478** **9 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(4 Microfiche, 209 Pages)**



1. In a document inserter having a plurality of document feeder stations, a central processor for providing address and command signals to each of the feeder stations, the central processor having a supervisory program stored therein including a data table and a configuration PROM which include information on the type of feeder station and the functions to be performed thereby, a scanner means for detecting a predetermined code on a coded document, and a universal feeder interface circuit for each feeder station comprising:

address means for providing each feeder station with a unique address,

distributed processor means associated respectively with each feeder station for storing feeder programs containing instructions for the feeder for feeding documents,

means for interconnecting the distributed processor means with the central processor and the scanner,

and each said feeder station thereby feeding documents in accordance with the predetermined code on said coded document when said central processor provides the unique address and command signals.

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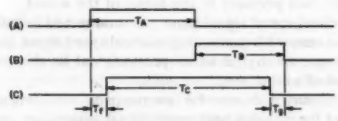
**4,517,651**

## AUTOMATIC VENDING MACHINE

**Kikuo Kawasaki, and Tomomi Sano, both of Tokyo, Japan, assignors to Fuji Electric Company, Ltd., Kanagawa, Japan**

**Filed Oct. 14, 1981, Ser. No. 311,466**
**Int. Cl.³ B67D *5/06***
**U.S. Cl. 364—479** **4 Claims**




1. A vending machine for vending plural kinds of commodities, with each commodity being formed from at least three component materials, comprising:

(1) input means for selectively inputing control data representative of a kind of commodity, a desired quantity of the commodity to be vended and desired ratios for said at least three component materials forms the commodity to be vended;

(2) a memory storing numerical data;

(3) a microcomputer, including a control program, for:

(a) selecting numerical data from said memory according to said input data, and

(b) computing output feed time duration control signals, representative of corresponding feed times that each component material should be supplied at a respective constant feed rate to form a desired commodity, using said input data and said selected numerical data, and wherein the feed time duration control signal for the third component material is obtained by substracting signals representing first and second short time intervals from the sum of signals representing the feed time durations for the first and second component materials, said first and second short time intervals being relatively short compared to the time durations represented by the at least three time duration control signals;

(4) component supply means for supplying each of the three component materials at a substantially constant feed rate into a commodity container; and

(5) control means, responsive to said output feed time duration control signals, for controlling the component supply means to cause said third component material to be dispensed during a period starting said first short time interval after the start of dispensing of said first component material and ending said second short time interval before the end of the dispensing of said second component material.

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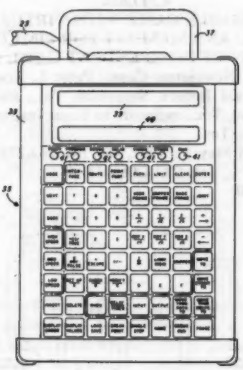
**4,517,652**

## HAND-HELD MANIPULATOR APPLICATION MODULE

**Ross L. Bennett, Round Rock; Robert B. Price, Austin; Clyde H. Springen, Austin, and Harlan C. Kilbourn, Austin, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Mar. 5, 1982, Ser. No. 355,288**
**Int. Cl.³ B25J** *9/00;* **G06F** *15/46*
**U.S. Cl. 364—513** **4 Claims**



1. A hand-held application module, for directing the operation of a programmable manipulator having a plurality of segments movable with respect to each other, controlled by digital computing means employing a robot programming language, including actuating means, the programmable manipulator having an end effector and motive means, responsive to the actuating means for causing desired movement of the end effector, comprising:

(a) programming mode means for enabling the entry of robot programming language statements and parameters wherein the program statements are translated into an internal code to represent the robot programming language employed;

(b) automatic teaching mode means for enabling the entry of data to define any positions of desired points for the end effector;

(c) entry means for receiving robot programming language statements and parameters, and data; and

(d) interface means, for receiving program statements and parameters, and data from the entry means, for transmitting to the actuating means which is responsive to the robot programming language statements and parameters, and to the data, to activate the motive means to cause the end effector to move between desired points defined by the teaching mode means.

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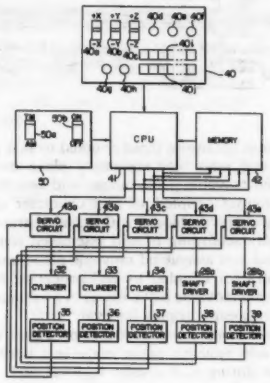
**4,517,653**

## METHOD FOR CONTROLLING AN INDUSTRIAL ROBOT

**Akira Tsuchihashi, Nagareyama, and Kazuyoshi Teramoto, Funabashi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 23, 1982, Ser. No. 422,300**
**Claims priority, application Japan, Sep. 30, 1981, 56-153708**
**Int. Cl.³ G06F** *15/46;* **G05B** *19/42*
**U.S. Cl. 364—513** **8 Claims**




1. A method for controlling an industrial robot which sequentially works a plurality of substantially identical workpieces at working points thereof measured with respect to at least one reference point thereof, comprising the steps of:

teaching provisional working points and at least one provisional reference point by sensing a portion of a first one of the workpieces and storing position data of said provisional working points and said provisional reference point;

determining a position of an actual reference point for another of said workpieces by sensing a portion of said other workpiece by a sensor attached to a hand of said industrial robot and determining by calculation a distance and direction from said provisional reference point to said actual reference point based on the stored data; and

determining actual working points of said other workpiece based on the stored data of said provisional working points and said distance and direction to move a working hand of said industrial robot to said actual working points.

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**4,517,654**

## VIDEO PROCESSING ARCHITECTURE

**Wesley F. Carmean, Reno, Nev., assignor to IGT, Reno, Nev.**

**Filed Aug. 9, 1982, Ser. No. 406,672**
**Int. Cl.³ G06F** *3/14*
**U.S. Cl. 364—521** **11 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(4 Microfiche, 183 Pages)**

1. An apparatus for selectably displaying a stationary plane

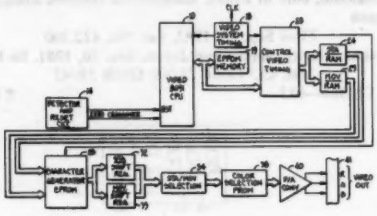
image and a movable plane image on a video display, comprising:

first means for storing image forming instructions at addressable storage locations and for supplying said image forming instructions from each addressable storage location;

a processor coupled to said first means for assembling said stationary plane image and assembling said movable plane image during a display interval, in accordance with said image forming instructions, and in response to image forming data input to said processor via a processor data bus;

a video controller coupled to said processor for generating a vertical display synchronization signal output and a horizontal display synchronization signal output;

a character generator including a plurality of addressable character blocks from which a display image output may be formed;



second means having an input coupled to said processor for storing said assembled stationary plane image and said assembled movable plane image, said second means having an output coupled to said character generator for selecting character blocks within said character generator for display according to said assembled stationary plane image and said assembled movable plane image;

a row subtractor coupled to said processor for discretely shifting said movable plane image in a vertical display axis once during each display interval;

a horizontal counter coupled to said processor for discretely shifting said movable plane image in a horizonal display axis once during each display interval; and

means coupled to said character generator for selecting, according to a processor assigned priority and on a picture element basis, between display of said stationary plane image and display of said movable plane image and for forming a composite image to be displayed.

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**4,517,655**

## MULTIPLIER CIRCUIT FOR MULTIPLYING AN INFORMATION SIGNAL BY A PERIODIC SIGNAL

**Theodoor A. C. M. Claasen; Albert J. Stienstra, and Arthur H. M. van Roermund, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 10, 1982, Ser. No. 416,737**

**Claims priority, application Netherlands, Oct. 14, 1981, 8104668**

**Int. Cl.³ H03C *1/00***

**U.S. Cl. 364—703** **7 Claims**

1. A multiplier circuit for multiplying an information signal x(t) by a periodic signal y(t) having a period $1/f_o$, comprising:

a. pulse generator circuit for generating a group of N pulse signals g(k;t) on N pulse channels **25**(k) of the generator circuit wherein k=0, 1, 2, 3, . . . N−1, N being at least equal to three and wherein

a.1. each group of N pulse signals has a group pulse repetition rate $T_o1/f_o$;

a.2. the pulses in the group of pulse signals g(k;t) occur at instants $t_o+k\ T_o/N+iT_o$, wherein $t_o$ represents a constant and i= . . . −2, −1, 0, 1, 2, . . . ;

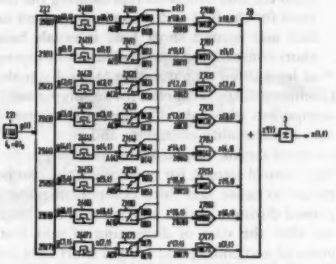
b. N switching circuits **21**(k) each having:

b.1. a control input A(k) which is coupled to the control channel **25**(k) of the pulse generator, the pulse signal g(k;t) being applied to this control channel;

b.2. an information signal input B(k) for receiving the information signal x(t);

b.3. a signal channel **26**(k) for carrying a signal output D(k),

c. N weighting networks **27**(k) each network having a constant weighting factor W(k) defined by the relation $W(k)=y(t_o+k\ T_o/N)$, each weighting network being



coupled to a one of the signal channels and generating a product signal,

d. an adder device **28** connected to each one of the signal channels of the weighting networks for adding the product signals together;

e. N pulse reshaping circuits **24**(k) for converting a pulse applied thereto into a pulse whose width $\tau$ is equal to an integral fraction times $1/f_o$, each pulse reshaping circuit being coupled to a one of the switching circuits.

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**4,517,656**

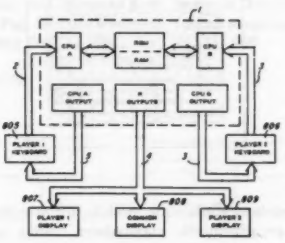
## PROGRAMMABLE GAME WITH VIRTUAL CPU'S SHARING ALU AND MEMORY FOR SIMULTANEOUS EXECUTION OF INDEPENDENT GAME INPUTS

**Duane Solimeno, Newington, Conn.; Peter L. Koeppen, Houston, Tex.; Gerald Rogers, Sugarland, Tex., and Sammy K. Brown, Midland, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed May 11, 1981, Ser. No. 262,278**

**Int. Cl.³ G06F *15/44***

**U.S. Cl. 364—900** **4 Claims**



1. A game apparatus comprising:

input means for inputting of data;

memory means for storing of the data;

processing means for processing of data and having first and second set of terminals with the first set of terminals being connected to the input means and memory means;

display means for displaying of the processed data, the display means being connected to the second set of terminals, and the processor means includes:

a control and timing means for providing two sets of pro-

gram sequences that define operation of the game apparatus;

coupling means for receiving data from the memory means via the first set of terminals and includes an arithmetic means for performing operations in accordance with instructions of the two sets of program sequences on the received data;

first output storage means for receiving data from the memory means through the arithmetic means for passing the data via a first member of the second set of terminals to the display means during the execution of a first set of program sequences of the two sets of program sequences;

a second output storage means for receiving data from the input means through the arithmetic means and for passing the data to the second member of the second set of terminals during the execution of a second set of program sequences of the two sets of program sequences;

a first register means for storing data from the memory means via the arithmetic means during the execution of the first set of program sequences and for addressing the memory means with the stored data during the execution of the second set of program sequences; and

a second register means for storing data from the memory means via the arithmetic means during the execution of the second set of program sequences and for addressing the memory means with the stored data during the execution of the first set of program sequences.

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**4,517,657**

## INTEGRATED BIT PROCESSOR/WORD PROCESSOR CONTROL SYSTEM

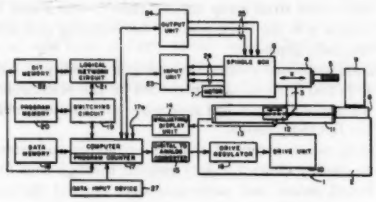
**Ernst Schwefel, Traunreut, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany**

**Filed Jul. 13, 1982, Ser. No. 397,839**

**Claims priority, application Fed. Rep. of Germany, Aug. 4, 1981, 3130746**

**Int. Cl.³ G06F** *7/00*

**U.S. Cl. 364—900** **9 Claims**



1. In a programmable process control system of the type comprising a multiple bit computer which comprises a program counter, a data memory coupled to the computer, and a program memory which stores a plurality of computer commands, the improvement comprising:

a program controllable logical network comprising means for providing individual bit processing of individual bit information;

a bit memory coupled to the logical network for storing said individual bit information;

a plurality of commands for the bit processing means stored in the program memory, said computer commands and said commands for the bit processing means stored in the program memory as an integrated program for the process control system; and

means for interconnecting the program memory, the computer, and the logical network to form an integrated process control system, said interconnecting means comprising:

first means, responsive to the program counter, for directing the plurality of commands for the bit processing means from the program memory to the logical network for execution by the bit processing means;

second means, responsive to the program counter, for directing the plurality of computer commands from the program memory to the computer for execution by the computer;

switching means for isolating the computer from the plurality of commands for the bit processing means; and

means for supplying to the computer a computer command for incrementing the program counter in response to each of the plurality of commands for the bit processing means from which the computer is isolated, such that the command reading time of the computer is preserved during the execution of commands by the individual bit processing means.

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**4,517,658**

## PICTURE INFORMATION FILING SYSTEM FOR PERMANENTLY STORING PORTIONS OF PREVIOUSLY PERMANENTLY STORED DATA LOGICALLY COMBINING THE PORTIONS

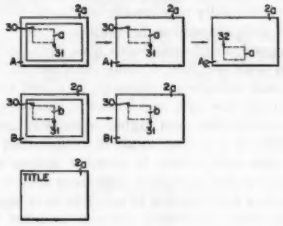
**Kazuhiko Iida, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Continuation of Ser. No. 203,573, Nov. 5, 1980, Pat. No. 4,408,301. This application Jul. 13, 1983, Ser. No. 513,322**

**Claims priority, application Japan, Nov. 6, 1979, 54-143714; Nov. 6, 1979, 54-143715; Nov. 6, 1979, 54-143717**

**Int. Cl.³ G06F** *3/14;* **G06K** *15/20*

**U.S. Cl. 364—900** **4 Claims**




1. A method for synthesizing picture information in a picture information filing system comprising a nonvolatile device for recording a number of pictures corresponding to picture information, inputting means for inputting the picture information, a picture element memory for storing the picture information, and a display section for displaying the picture information thereon, comprising the steps of:

(a) causing picture information of one page recorded in the nonvolatile device to be displayed on the display section;

(b) designating a predetermined area of the picture information displayed on the display section;

(c) extracting the picture information of only the designated predetermined area;

(d) designating the position to which the picture information of the predetermined area is to be shifted;

(e) transferring the extracted picture information to an area corresponding to the designated position and storing the transferred picture information in the picture element memory;

(f) recording the transferred picture information in the nonvolatile device;

(g) repeating the steps (a) to (e) with respect to another page of picture information; and

(h) obtaining a logic sum of the picture information recorded in the nonvolatile device in the step (f) and the picture information stored in the picture element memory and storing the logic sum in the picture element memory.

4,517,659

## CONSTANT-DISTANCE STRUCTURE POLYCELLULAR VERY LARGE SCALE INTEGRATED CIRCUIT

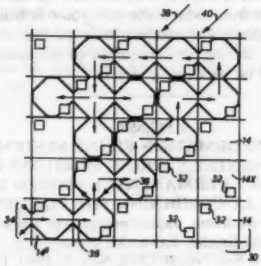
John T. Chamberlain, Macclesfield, England, assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 8, 1982, Ser. No. 447,832

Claims priority, application United Kingdom, Dec. 8, 1981, 8137017

Int. Cl.³ G06F *13/00;* G11C *5/06;* H01L *27/10, 27/15*

U.S. Cl. 364—900 7 Claims



1. An integrated circuit comprising an array of a plurality of data processing cells, each of said cells comprising:

first, second, third and fourth boundaries shared with first, second, third and fourth neighboring cells respectively in unidirectionally sequentially numbered by unit increment and sequentially rotationally displaced first, second, third and fourth respective directions,

first, second, third and fourth data links associated respectively with said first, second, third and fourth boundaries, and each selectively operable in a first mode to receive data from that link next lower in number and to provide data to that link next higher in number and is selectively operable in a second mode to couple data received from said link next lower in number across said associated boundary and to receive data from across said associated boundary for coupling to said link next higher in number,

a single data processing element coupled intermediately between a first one of said links and that link next higher in number than said first one of said links,

a first coupling section coupled to transfer said data between said first data link and said second data link,

a second coupling section coupled to transfer said data between said second data link and said third data link,

a third coupling section coupled to transfer said data between said third data link and said fourth data link, and

a fourth coupling section coupled to transfer said data between said fourth data link and said first data link, where

said array comprises two types of cells;

a first type of cell wherein said data processing element is associated with said first coupling section and

a second type of cell wherein said data processing element is associated with said third coupling section, and where

said first and second types of cells are arranged alternately on said integrated circuit such that no cell of said first type can transfer data to another cell of said first type and no cell of said second type can transfer data to another cell of said second type, each cell in said array being coupled to receive a command and being operable to respond thereto to transfer data between itself and a selected neighboring cell by a communicating cell having the link adjacent to said selected neighboring cell selected to operate in said second mode to communicate with the selected neighboring cell and by the link in the selected neighboring cell adjacent to said communicating cell also being selected to operate in said second mode, whereby

the path between any one pair of sequential data processing elements in any chain grown in said array is of the same length as any other path between any other pair of sequential data processing elements in the chain.

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4,517,660

## FOLDABLE ELECTRONIC APPARATUS

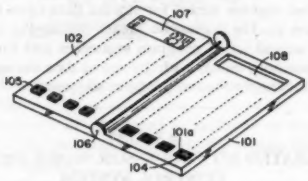
Hideo Fushimoto; Shigeru Toyomura, both of Kawasaki; Yoshiaki Nishimuro, Hachiohji; Osamu Asakura, and Masahiro Rachi, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 244,258, Mar. 16, 1981, abandoned. This application May 6, 1983, Ser. No. 490,550

Claims priority, application Japan, Mar. 27, 1980, 55-39249; May 14, 1980, 55-62750

Int. Cl.³ G06C *7/02;* G06F *3/02*

U.S. Cl. 364—708 7 Claims



3. A foldable electronic apparatus comprising:

housing means having a first case and a second case mutually connected in a foldable manner for movement between open and folded positions;

first keyboard means comprising a plurality of keys mounted on at least one of said first case and said second case and actuatable from a top surface thereof when said housing means is in the open position for entering character data into said apparatus;

second keyboard means comprising a plurality of numerical keys and function keys provided on and actuatable from a top surface of said first case when said housing means is in the fiolded position;

display means provided on a top surface of said second case to display character data entered through said first keyboard means and numerical data entered through said second keyboard means; and

means providing a display aperture, for enabling numerical data and processed data entered through said second keyboard means to be visually displayed on a portion of said display means, provided in said first case in a position through which said portion of said display means can be viewed when said housing means is in the folded position.

5. A two-faced keyboard apparatus, comprising:

housing means having a first exposed surface, a second exposed surface opposite said first exposed surface, and predetermined thickness defined between said first and said second exposed surfaces; said housing means further being formed with hole means extending therethrough in the direction of the predetermined thickness thereof;

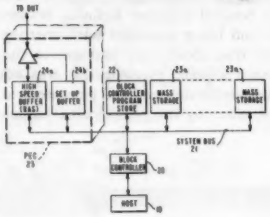
key top means disposed within said hole means for movement in the direction of the predetermined thickness of said housing means, to be actuated from both of said first exposed surface and said second exposed surface of said housing means; and

key signal generating means for generating a key signal in response to movement of said key top means by actuation from either of said first and said second exposed surfaces.

## 4,517,661
## PROGRAMMABLE CHIP TESTER HAVING PLURAL PIN UNIT BUFFERS WHICH EACH STORE SUFFICIENT TEST DATA FOR INDEPENDENT OPERATIONS BY EACH PIN UNIT

Matthew C. Graf; Hans P. Muhlfeld, Jr., both of Highland, and Edward H. Valentine, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 16, 1981, Ser. No. 283,778
Int. Cl.[3] G06F *11/00*; G01R *31/28*
U.S. Cl. 364—900 9 Claims




1. A test system for testing circuits in integrated circuit chips, through the pins of the device in which the chips are mounted, by transmitting a test program of test signals and receiving output signals from the circuits, comprising:

a host computer for controlling the test system;

a plurality of electronic blocks for testing circuit, each testing block including a system bus, a controller connected to said host computer and said system bus, means for mass storage of the test program connected to said system bus, and a plurality of pin electronic units within each testing block and connected to the system bus and a predetermined pin of a device under test, each of the pin electronic units including a buffer for storing the test program for use by said pin electronic unit, said controller responsive to the host computer for controlling the transfer of the test program between said mass storage means and the buffer of each pin electronic unit, whereby each unit contains sufficient test data to operate independently of the other pin electronic units.

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## 4,517,662
## HIGH-SPEED, COMPACT MAGNETIC BUBBLE STRETCHER

LuVerne R. Peterson, San Diego, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jun. 29, 1983, Ser. No. 508,946
Int. Cl.[3] G11C *19/08*
U.S. Cl. 365—44 10 Claims

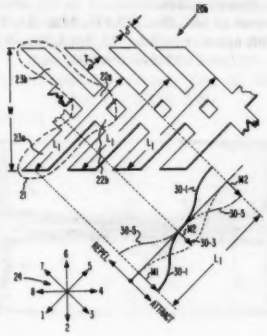
1. A magnetic bubble memory of the type that includes a magnetic film, a plurality of magnetic bubbles in said film, an insulating layer over said film, and an electromagnetic structure on said insulating layer for stretching said bubbles to aid in their detection; wherein said structure is comprised of:

a plurality of elongated permalloy elements on said insulator and arranged in spaced rows with only one of said elements per row;

each element consisting of a pattern that is X-shaped which repeats along the element in the direction of elongation;

said X in said pattern having two short legs and two long legs;

said pattern being repeated such that the short legs of one X join with the long legs of the next X; and wherein




the length of each elongated permalloy element is at least one hundred times its width and is substantially longer than the stretched bubbles that it produces.

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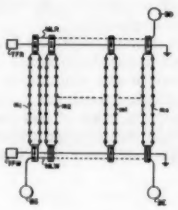
## 4,517,663
## METHOD OF REWRITING DATA IN NON-VOLATILE MEMORY, AND SYSTEM THEREFOR

Ryoji Imazeki, Hachioji, and Michiya Inoue, Hino, both of Japan, assignors to Fujitsu Fanuc Limited, Minamitsuru, Japan

Division of Ser. No. 183,037, Sep. 2, 1980, Pat. No. 4,447,887.
This application Dec. 22, 1983, Ser. No. 564,208
Claims priority, application Japan, Sep. 4, 1979, 54-113256
Int. Cl.[3] G11C *11/40*
U.S. Cl. 365—222 13 Claims



1. A method of rewriting data in a non-volatile memory including a data storage area, having a plurality of portions, and a save area, by storing first data in the data storage area of the non-volatile memory and rewriting the first data, the method comprising the steps of:

(a) storing the first data in the save area of the non-volatile memory;

(b) erasing the first data stored in the data storage area, generating a predetermined pattern in the area in which the first data was stored;

(c) writing second data into the data storage area;

(d) detecting an interruption in the power supply;

(e) successively retrieving data from each of the plurality of portions of the data storage area of the nonvolatile memory upon return of the power supply;

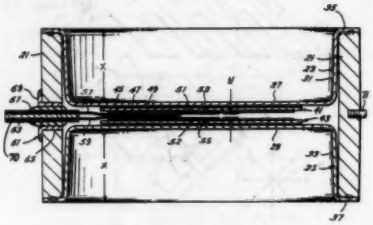
(f) testing each successive portion of the plurality of portions of the data storage area for the predetermined pattern; and

(g) writing the first data stored in the save area into the portion of the data storage area that has the predetermined pattern.

## 4,517,664
## SEISMIC APPARATUS

Carl O. Berglund, Houston, Tex., assignor to Teledyne Exploration Company, Houston, Tex.

Continuation-in-part of Ser. No. 135,476, Mar. 31, 1980, Pat. No. 4,336,639. This application Nov. 12, 1981, Ser. No. 320,417
Int. Cl.³ H04R 17/00
U.S. Cl. 367—163 17 Claims



16. A seismic streamer section including
a flexible tube adapted to contain liquid,
end means at each end of the tube for making mechanical and electrical connection with an adjacent tube and for closing the ends of the tube,
bulkheads in the tube disposed at intervals along the length of the tube,
mechanical tension lines extending from one end means at one end of the tube through the tube and said bulkheads to the other end means at the other end of the tube,
hydrophones in the tube disposed at intervals along the length of the tube between the bulkheads, and
an electric conductor bundle in the tube including through conductors extending from said one end means to said other end means and other conductors extending from said one end means to various ones of said components,
each hydrophone comprising a liquid tight case and piezoelectric means disposed within the case, the case including parallel flexible diaphragms
said piezoelectric means comprising first wafer shaped piezoelectric electric transducer means secured to the inner face of only one of said diaphragms and second wafer shaped piezoelectric transducer means secured to the inner face of only the other of said diaphragms, the adjacent faces of said piezoelectric transducer means being separated by less than twice the thickness of each transducer means.

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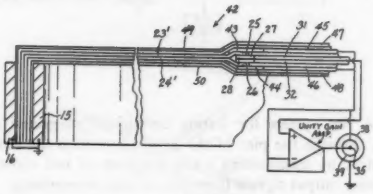
## 4,517,665
## ACOUSTICALLY TRANSPARENT HYDROPHONE PROBE

Aimé S. DeReggi, Boyds, and Gerald R. Harris, Rockville, both of Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Division of Ser. No. 210,044, Nov. 24, 1980, Pat. No. 4,433,400. This application Nov. 17, 1983, Ser. No. 553,387
Int. Cl.³ H04R 17/00
U.S. Cl. 367—163 9 Claims

1. A hydrophone device comprising supporting hoop means of a selected area, sheet means of biaxially oriented polymer material secured in said hoop means and held thereby in a taut condition, said polymer sheet means having a poled piezoelectric area of predetermined size, the selected area of said sheet means defined by said hoop means being larger than the size of said poled piezoelectric area, and said poled piezoelectric area being located in said sheet means in spaced relation to said hoop means such that said hoop means during use remains outside the region of the medium subjected to the acoustic energy and the point being probed by said hydrophone device, said sheet means having electrode means of deposited metal on one side of said poled piezoelectric area, and guard ring means of deposited metal on the other side of said piezoelectric area, said guard ring means being substantially coaxial with said electrode means, said sheet means having a thickness selected such that it is substantially acoustically transparent in liquid, and respective electrical leads of deposited metal on said sheet means, connected to said electrode means and guard ring means and extending toward the periphery of said sheet means, said deposited electrode means, guard ring means, and electrical leads comprising metal films having thicknesses selected such that the electrode means, guard ring means, and electrical leads do not affect the acoustical transparency of said sheet means, wherein said sheet means comprises two identical polymer membranes bonded together defining respective piezoelectric laminae and being provided with abutting deposited electrodes smaller than about 1 mm in diameter, the two membranes each having a poled piezoelectric area adjacent said abutting deposited electrodes, and said piezoelectric area being oppositely poled, whereby the piezoelectric laminae are electrically connected in parallel, wherein said electrical leads connected to said abutting deposited electrodes include respective superimposed strips of deposited metal between the two membranes, having a common center connection junction near the perimeters of the membranes, and wherein said electrical leads connected to said guard rings include strips of deposited metal on the outer surfaces of the two membranes adjacent said superimposed strips in electricaly shielding relation thereto, having a common guard connection junction near the perimeters of the membranes, and wherein said sheet means also comprises two additional polymer membranes bonded to the outer surfaces of said two identical polymer membranes and having outer metallized surfaces defining ground electrodes, a triaxial transmission line secured to said hoop means, said transmission line having an outer conductor sleeve, a guard sleeve and a center conductor, means connecting said common connection junction to said center conductor, means connecting said common guard connection junction to said guard sleeve, and means connecting said ground electrodes to said outer conductor sleeve.



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## 4,517,666
## OPTICAL HEAD

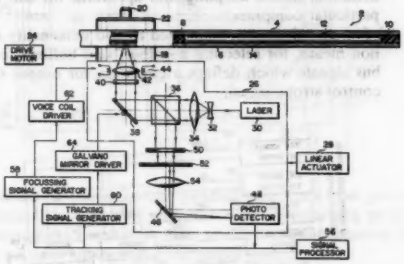
Hideo Andō, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jun. 21, 1982, Ser. No. 390,775
Claims priority, application Japan, Jun. 22, 1981, 56-96198; Sep. 17, 1981, 56-146541; Sep. 17, 1981, 56-146544; Sep. 17, 1981, 56-146545; Oct. 22, 1981, 56-168963
Int. Cl.³ G11B 7/00
U.S. Cl. 369—45 17 Claims

1. An optical head for focusing a light beam on a light reflecting layer on which a tracking guide is formed, comprising:
means for generating the light beam;
means for directing the generated light beam;
an objective lens between said directing means and said light reflecting layer for converging the directed light beam into a convergent light beam having a beam waist, for projecting the convergent light beam onto the light reflecting layer, and for converging a divergent light beam reflected by the light reflecting layer, a beam spot corresponding to the beam

waist of the converged light beam being formed on the light reflecting layer when the objective lens is in a just in-focusing state, and a beam spot of a larger size than that of the beam waist being formed on the light reflecting layer when the objective is in defocusing state;

means for converting the reflected light beam transmitted from the objective lens into a component beam which is deflected in accordance with the distance between said objective lens and the light reflecting layer; and




a photodetector with a light receiving surface substantially located on an image forming plane on which an image of the beam spot corresponding to the beam waist is formed by said objective lens when the objective lens is in the just in-focusing state, the light receiving surface including at least first and second photosensitive regions which are arranged in a direction along which a projected pattern formed by the component beam is shifted by said converting means.

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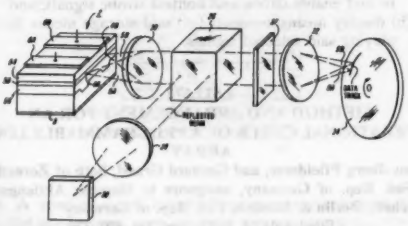
**4,517,667**

## DIRECT READ AFTER WRITE OPTICAL DISK SYSTEM

**Robert A. Sprague, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jun. 10, 1982, Ser. No. 387,294**
**Int. Cl.³ G11B 7/12**
**U.S. Cl. 369—122** **4 Claims**




1. An optical disk scanning system with direct read after write capabilities comprising:

a light level sensitive recording material capable of recording data along a data track positioned at least substantially concentric with other data tracks;

first means for moving said recording material;

a pair of integrated solid state lasers;

drive means for said lasers for providing an information modulated light beam and an unmodulated light beam;

second means for transmitting said beams to only said data track; and

third means for detecting changes in a physical property of the unmodulated beam reflected from said recording material.

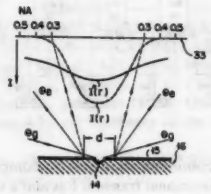


**4,517,668**

## OPTICAL DISK WITH NARROW GUIDE TRACKS

**Takashi Takaoka; Masahiko Mochizuki; Mitsuo Yamashita, and Tadao Miura, all of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Division of Ser. No. 235,427, Feb. 17, 1981,. This application Apr. 29, 1983, Ser. No. 490,225**
**Claims priority, application Japan, Feb. 18, 1980, 55-18698**
**Int. Cl.³ G11B 7/00**
**U.S. Cl. 369—111** **7 Claims**




2. An optical disk comprising:

a substrate including optical guiding tracks having protruding or recessed reliefs formed on said substrate at a desired pitch and having a width of 0.2 to 0.41 μm; and

an optical recording layer formed over said substrate into which information can be written by irradiating a focussed laser beam modulated by said information.

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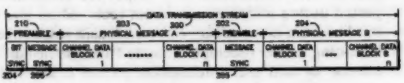
**4,517,669**

## METHOD AND APPARATUS FOR CODING MESSAGES COMMUNICATED BETWEEN A PRIMARY STATION AND REMOTE STATIONS OF A DATA COMMUNICATIONS SYSTEM

**Thomas A. Freeburg, Arlington Heights, and Jay Krebs, Crystal Lake, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jul. 11, 1983, Ser. No. 512,800**
**Int. Cl.³ H04J 3/16**
**U.S. Cl. 370—82** **12 Claims**




1. A signalling system for communicating messages via a communications medium between a primary station and a plurality of remote stations in a data communications system, said signalling system including a variable length message which is transmitted between an originating station and received by at least one destination station, which includes a bit synchronization field, a message synchronization field, and a plurality of channel data blocks being comprised of:

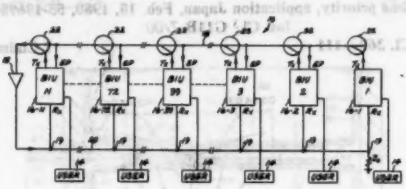
the first and second channel data blocks including an information field including control data and a check word, a parity field coded from the information field according to a predetermined code, and the bits of the fields being interleaved such that consecutive bits of a field are separated by a predetermined number of bits; and

the third and following channel data blocks including an information field including data, a parity field coded from the information field, and the bits of the fields being interleaved such that consecutive bits of a field are separated by a predetermined number of bits, and the information field of the last channel data block further including a check word coded from the data in the information field of the third and following channel data blocks.

## 4,517,670
## PREEMPTIVE BID COMMUNICATION SYSTEM

Mehmet E. Ulug, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 15, 1983, Ser. No. 504,716
Int. Cl.³ H04J 3/02
U.S. Cl. 370—85 41 Claims



1. A bus communication system comprising:

(a) a unidirectional transmit bus and a receive bus coupled to one another such that information packets leaving said transmit bus are placed on said receive bus;

(b) a plurality of interface units (BIUs) coupled to each of said transmit and receive buses at spaced locations along said buses; said BIUs communicating with one another by transmitting information packets on said transmit bus and receiving transmitted information packets from said receive bus;

(c) each of said BIUs periodically obtaining a user information packet to be transmitted and each respective BIU operating;

(1) in a free mode wherein transmission of said user information packet is initiated substantially immediately when said each respective BIU determines both of said buses are idle, but aborted if said each respective BIU concurrently detects energy on said transmit bus from an upstream BIU;

(2) in a preemptive mode, after having aborted transmission of said user information packet, by initiating a respective communication period each time a complete information packet is received from said receive bus, transmitting energy on said transmit bus during each said respective communication period, and retransmitting the aborted packet after termination of a respective communication period during which energy is not received on said transmit bus from an upstream BIU, each said respective BIU operating in said preemptive mode from the instant transmission of said user information packet is aborted until retransmission of said aborted information packet is successfully completed, said communication period equal to at least the maximum signal propagation time along both said buses; and

(3) in a captive mode, during which transmission of a user information packet from said each respective BIU is precluded, extending from the instant said each respective BIU has successfully transmitted a user information packet until both buses have been inactive for a communication period following the receipt of a complete information packet by said each respective BIU and for a captive period immediately thereafter, said captive period equal to at least the maximum signal propagation time along both said buses.

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## 4,517,671
## APPARATUS FOR OPERATIONAL ANALYSIS OF COMPUTERS

James D. Lewis, 100 Second St., Hackensack, N.J. 07602

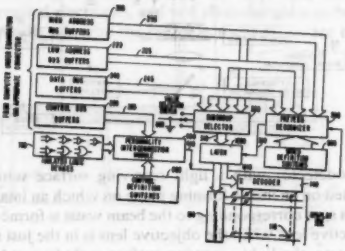
Filed Nov. 30, 1982, Ser. No. 445,578
Int. Cl.³ G06F 11/22
U.S. Cl. 371—19 8 Claims

1. An apparatus for use in the operational analysis of a digital computer having control, address, and/or data signal buses, by displaying representations of selectable signals in response to the occurrence of selectable conditions comprising:

(a) input buffering means, connectable to such a computer, for receiving a plurality of signals from signal buses within said computer and for outputting a plurality of buffered signals;

(b) interchangeable personality definition means including digital logic means, connected to said input buffering means, for receiving buffered control bus signals and for outputting a control strobe signal, each such personality definition means adapting said apparatus for use with a particular computer;

(c) first switch means, connected to said personality definition means, for selecting a state of said buffered control bus signals which defines a condition for output of said control strobe signal;



(d) second switch means, including digital logic means, connected to said input buffering means, for selecting signals to be displayed from said address and/or data signal buses;

(e) pattern recognizer means, including digital logic means, connected to said input buffering means, and said personality definition means for identifying states of address and data bus signals and outputting an enable strobe signal;

(f) means connected to said pattern recognition means for defining digital values to be identified by said pattern recognition means;

(g) storage means connected to said pattern recognizer means and said second switch means, for storing and outputting said signals selected to be displayed in response to said enable strobe and control strobe signals; and

(h) display means connected to said storage means for displaying said selected signals.

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## 4,517,672
## METHOD AND ARRANGEMENT FOR AN OPERATIONAL CHECK OF A PROGRAMMABLE LOGIC ARRAY

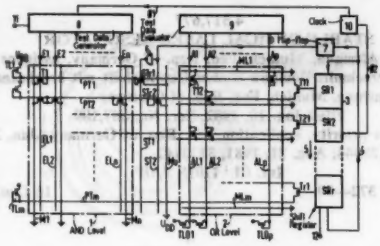
Hans-Joerg Pfleiderer, and Gerhard Grassl, both of Zorneding, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 23, 1982, Ser. No. 401,229
Claims priority, application Fed. Rep. of Germany, Sep. 7, 1981, 3135368
Int. Cl.³ G06F 11/00
U.S. Cl. 371—27 11 Claims

1. A method for the function check of a programmable logic array which has output lines, ground lines, input lines, product term lines intersecting the input lines and combined therewith to define an AND plane and intersecting and combined with the output lines to define an OR plane, the product term lines and the output lines having a reference potential applied thereto, and switching transistors at selected intersections of the product term lines and the input and output lines, the switching transistors in the AND plane having a control input connected to a respective input line and a controlled segment connected between the respective term line and a ground line, the switching transistors in the OR plane having a control

input connected to the respective product term line and a controlled segment connected to the respective output line and a ground line, the method comprising the steps of:

applying a first logic level to each input line in a first sequence while applying a second logic level to the other input lines;



disconnecting the individual product term lines from ground potential in a second sequence while maintaining ground potential on the other product term lines; and evaluating the bit patterns appearing at the output lines.

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**4,517,673**

## COMPUTER-BASED INTERLOCKING SYSTEM

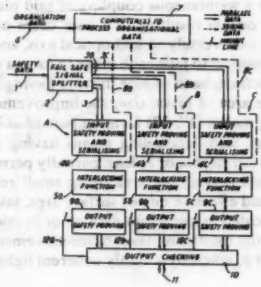
**Christopher R. Brown, Bromham, Near Chippenham; John D. Corrie, and William G. J. Wilson, both of Chippenham, all of England, assignors to Westinghouse Brake & Signal Co., Wiltshire, England**

**Filed Sep. 28, 1982, Ser. No. 425,918**

**Claims priority, application United Kingdom, Oct. 10, 1981, 8130644**

**Int. Cl.³ G06F *11/00, 11/08***

**U.S. Cl. 371—36** **6 Claims**



1. A control signal interlocking system comprising three parallel sub-systems, each of which is connected to receive the same input data and is arranged to perform a signal interlocking function in a continuously repeated cyclic operation, a sub-system output gating circuit, controlled by a sub-system output selecting logic circuit, for preferentially selecting and connecting a first sub-system output to provide the system output and for alternatively selecting a second sub-system output if the first sub-system is found to be in error, said sub-system output selecting logic circuit comprising a comparator in each sub-system for receiving outputs from all the sub-systems, said comparators including difference determining means for determining difference results between pairs of the sub-system outputs, memory means for storing a reference table of possible difference results, and comparison means connected to said difference determining means and said memory means for comparing the actual difference results determined by said difference determining means with the reference difference results stored by the memory means to determine, if differences exist, if the first sub-system is in error.

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**4,517,674**

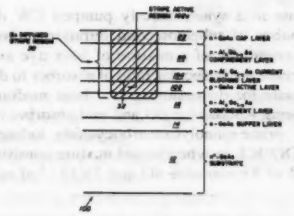
## ZINC-DIFFUSED NARROW STRIPE ALGAAS/GAAS DOUBLE HETEROSTRUCTURE LASER

**Yet-Zen Liu, Westlake Village; Chi-Shain Hong, Newbury Park, and Daniel Dapkus, Anaheim all of Calif.; James J. Coleman, Champaign, Ill., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 31, 1982, Ser. No. 413,596**

**Int. Cl.³ H01S *3/19***

**U.S. Cl. 372—45** **14 Claims**



1. A stripe-geometry semiconductor laser device comprising:

a semiconductor substrate of a first conductivity type having first and second surfaces;

a first semiconductor confinement layer formed on said first surface of said substrate, said first confinement layer being of said first conductivity type;

an active semiconductor layer formed on said first confinement layer, said active layer being of a second conductivity type and having a band gap narrower than that of said first confinement layer, said active layer and said first confinement layer forming a heterojunction therebetween;

a current blocking layer of a second conductivity type formed on said active layer, said current blocking layer having a band gap wider than that of said active layer, said current blocking layer and said active layer forming a heterojunction therebetween said stripe region passing through a portion of said current blocking layer;

a second semiconductor confinement layer formed on said current blocking layer, said second confinement layer being of said first conductivity type and having a band gap wider than that of said active layer;

an elongated stripe region located in a portion of said second confinement layer and in a portion of said active layer, said stripe region longitudinally extending between two reflective surfaces located on respective ends of said device, said stripe region being doped with an impurity of said second conductivity type; and

electrode means coupled to said second surface of said substrate and to a first surface of said second confinement layer;

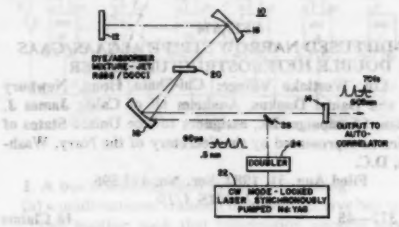
wherein laser oscillation takes place in said portion of said stripe region located in said active layer, the resultant laser radiation being guided by said portion of said stripe region located in said active layer.

4,517,675

## DYE LASER MEDIUM FOR SUBPICOSECOND LASER PULSE GENERATION

Gerard Mourou, and Theodore Sizer, II, both of Rochester, N.Y., assignors to The University of Rochester, Rochester, N.Y.

Filed Dec. 21, 1981, Ser. No. 332,647
Int. Cl.[3] H01S 3/20
U.S. Cl. 372—53 4 Claims



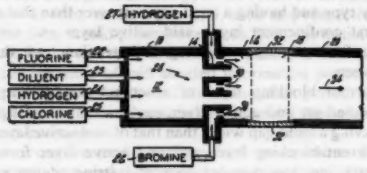

1. For use in a synchronously pumped CW dye laser to generate pulses of subpicosecond duration, a laser medium consisting essentially of a mixture of laser dye and saturable absorber where the molecular ratio of absorber to dye is 3 to 50 to compensate for dispersion in said laser medium, and said laser dye being Rhodamine 6G and said absorber is 1,3 prime-diethyl-4,2 prime-quinolyoxacarbocyanide iodide, which is known as DQOCI, or wherein said mixture consists essentially of $5\times10^{4}$M of Rhodamaine 6G and $3\times10^{-5}$ of said DQOCI.

4,517,676

## MULTI-SPECIES, CW COMBUSTION DRIVEN LASER EMPLOYING HYDROGEN BROMIDE

Richard A. Meinzer, Newington, and Gregory M. Dobbs, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 223,639, Jan. 9, 1981, abandoned. This application Feb. 24, 1983, Ser. No. 469,187
Int. Cl.[3] H01S 3/095
U.S. Cl. 372—89 3 Claims




1. A method of generating radiation in a laser system having at least two different compounds lasing simultaneously comprising the steps of:

mixing a first gas containing fluorine and a second gas containing hydrogen to form atomic fluorine and vibrationally excited hydrogen fluoride in a first reaction region;

passing said hydrogen fluoride and atomic fluorine through an expansion nozzle to a second reaction region;

mixing intimately molecular hydrogen and a gas containing bromine with said atomic fluorine and hydrogen fluoride in said second reaction region, whereby vibrationally excited hydrogen bromide is formed; and

resonating radiation emitted from said vibrationally excited hydrogen bromide and said vibrationally excited hydrogen fluoride in an optical cavity, wherein the improvement comprises:

reacting said molecular hydrogen with fluorine to form vibrationally excited hydrogen fluoride and atomic hydrogen in said second reaction region; and

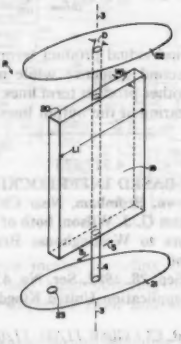
reacting said atomic hydrogen directly with molecular bromine in said second reaction region to form said vibrationally excited hydrogen bromide.

4,517,677

## STABLE OPTICAL LASER RESONATOR

Konrad Altmann, Munich, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Jun. 10, 1982, Ser. No. 387,189
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1981, 3125544; Aug. 21, 1981, 3133142
Int. Cl.[3] H01S 3/05
U.S. Cl. 372—99 16 Claims



1. In a stable optical laser resonator having an optical axis and capable of having a plurality of excited transversal oscillation modes so that a spontaneous coupling of said plurality of transversal modes occurs resulting in a laser beam oscillating along a beam path transversely to said optical axis, and including two mirrors arranged to face each other to form a space for an active lasing medium, each of said mirrors having an effective mirror surface area of given size, the improvement comprising decoupling means (1'', 23) forming part of at least one of said two mirrors, said decoupling means having a decoupling area which is permeable or at least partially permeable to said laser beam, said decoupling area being small relative to said given size of said effective mirror surface area, said decoupling area being located in said beam path on or in said at least one mirror where the oscillating laser beam movement comes substantially to a stop, whereby a highly coherent light impulse is obtained.

4,517,678

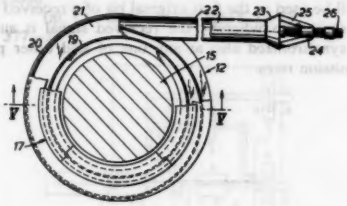
## APPARATUS FOR SEALING ELECTRODES IN ELECTRIC ARC FURNACES

Kevin D. Ball, Grimsby, Canada, and Peter Davies, North Anston, England, assignors to Coated Electrodes Limited, England

Filed Nov. 22, 1982, Ser. No. 443,852
Claims priority, application United Kingdom, Nov. 20, 1981, 8135012; Jul. 30, 1982, 8222022; Aug. 11, 1982, 8223179
Int. Cl.[3] H05B 7/12
U.S. Cl. 373—95 1 Claim

1. Apparatus for sealing an electrode in an electric arc furnace, the apparatus comprising an annular chamber adapted to encompass the electrode and including a ring-shaped cover member constructed of an electrically non-conductive refractory material consisting essentially of alumina and silica, above an upstanding cylindrical wall member formed with at least one passageway which is inclined with respect to the radius of

the chamber and is connected to receive gas under pressure and to discharge such gas onto and around the encompassed electrode, wherein the cover member is separable from the wall member and the wall member is manufactured from an electrically non-conductive material consisting essentially of alumina and silica, the lower surface of the ring-shaped cover member being inwardly inclined to assist correct location of



the cover member upon the cylindrical wall member and to direct the gas towards the electrode surface, and the internal diameter of the ring-shaped cover member being greater than the diameter of the electrode to define an annular spacing therebetween through which the gas discharged from said at least one passageway passes effectively to seal the space around the electrode.

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**4,517,679**

## COMMUNICATION OVER NOISY LINES

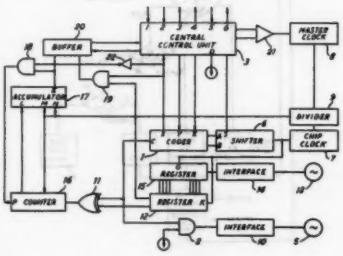
**Duncan G. D. Clark, Blackwater, Nr. Camberley; Ian D. Kimber, Bracknell, and Roderick G. May, Wealdstone, all of England, assignors to EMI Limited, Hayes, England**

**Filed Mar. 7, 1983, Ser. No. 473,055**

**Claims priority, application United Kingdom, Mar. 10, 1982, 8207043**

**Int. Cl.³ H04K *1/04***

**U.S. Cl. 375—37** **7 Claims**



1. A line network communication system including transmitter means capable of transmitting a series of coded data signals on a base band carrier signal and receiver means capable of receiving a transmitted signal and recovery therefrom said coded data signals wherein said receiver means comprises comparison means for comparing, in a search mode, successively received data signals with a series of coded reference signals at a number of different relative phases thereby to generate a corresponding number of comparison signals forming a set and means capable of changing the relative phases of the compared signals until at least one comparison signal in a set indicates a degree of correlation exceeding a threshold value,

means for verifying, in a tracking mode, that having so changed the relative phases of compared signals at least one comparison in each of a plurality of different sets, generated by comparing a corresponding plurality of series of successively received data signals with said series of coded reference signals, represents a degree of correlation exceeding said threshold value and, in dependence on a successful verification in the tracking mode, means for adjusting, in a locking mode, the relative phases of the compared signals so as to maintain a degree of correlation in excess of said threshold value thereby to permit recovery of the coded data signals.

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**4,517,680**

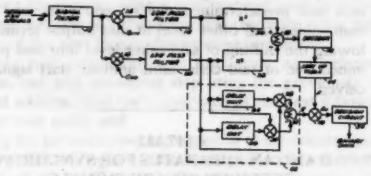
## ERROR VECTOR NORMALIZER

**William Betts, St. Petersburg, and Wesley H. Smith, Largo, both of Fla., assignors to Paradyne Corporation, Largo, Fla.**

**Filed Feb. 23, 1983, Ser. No. 468,954**

**Int. Cl.³ H04B *1/10***

**U.S. Cl. 375—75** **4 Claims**



1. In a modem in which a signal vector is generated which corresponds to a received data signal in a complex plane, a vector normalizer comprising:

means for deriving a normalizing signal indicative of the radius of said signal vector;

means for deriving a normalizing factor from said normalizing signal which depends on the inverse of said radius; and

multiplying means for multiplying said signal vector with said normalizing factor to obtain a normalized vector signal.

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**4,517,681**

## DIGITAL TIMING UNIT

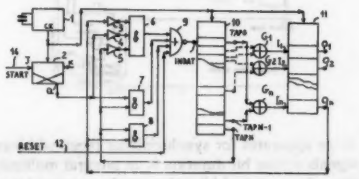
**Calogero Mantellina, Cerro Maggiore, and Daniele Zanzottera, Busto Garolfo, both of Italy, assignors to Honeywell Information Systems Inc., Milan, Italy**

**Filed Mar. 14, 1983, Ser. No. 474,915**

**Claims priority, application Italy, Mar. 22, 1982, 20304 A/82**

**Int. Cl.³ H04L *7/08***

**U.S. Cl. 375—106** **3 Claims**



1. A digital timing unit comprising a shift register having a plurality of N ordered cells, the shift register having a first cell input and an output for each cell, and further having a clock input terminal for loading a logical signal level in the first cell and also shifting the logical content of a cell for each received clock pulse, said digital timing unit further including a clock pulse generator for providing at its output a sequence of clock pulses having a predetermined frequency, said clock pulses being fed to said clock input terminal, said timing unit further comprising:

a plurality of EXCLUSIVE OR circuits, each having an input pair and an output, the input pair of said EXCLU-

SIVE OR circuits being connected to a predetermined output pair of said shift register;

logic circuit means having input terminals for receiving:

(a) an external start signal having a predetermiined binary level;

(b) a first feedback signal in output from the output of a predetermined one of said cells;

(c) a second feedback signal in output from the output of a predetermined one of said EXCLUSIVE OR circuits;

said logic circuit means having an output terminal connected to said first cell input of said shift register;

said logic circuit means supplying said first cell input terminal with one of two levels of a binary output signal, switching from one level to the other said output signal on reception of said start signal, maintaining said other level at said output terminal and concurrently masking any other possible start signal, until said other level is shifted into said predetermined one of said cells, and further maintaining said other level at said output terminal, following the shifting of said other level into said predetermined one of said cells, until another start signal is received.

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**4,517,682**

## METHOD AND AN APPARATUS FOR SYNCHRONIZING RECEIVED BINARY SIGNALS

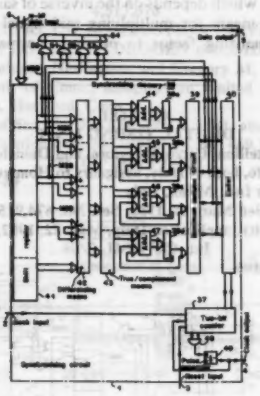
**Norbert Neyer, Zürich, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland**

**Filed Feb. 28, 1983, Ser. No. 470,523**

**Claims priority, application Switzerland, Jun. 9, 1982, 3549/82**

**Int. Cl.³ H04L *7/00***

**U.S. Cl. 375—106** **5 Claims**



1. In an apparatus for synchronizing received binary reception signals whose bit duration is an integral multiple n of the duration of an original bit, wherein the original bit is already synchronized and has a duration which is equal to the bit duration of that received signal which has been transmitted at the highest available transmission rate of other possible transmission rates, each other possible transmission rate being said highest transmission rate divided by a selectable integral divisor, and wherein each original bit, having a serial number and an address, has a reception quality factor which is stored in time succession in respect of the individual original bits in a common quality factor memory,

in combination:

means operative for forming the quality factor differences of successive original bits,

means operable for adding the quality factor differences of those original bits which have the same serial number within a received bit,

means for determining the maximum of the summed quality factor difference of n successive original bits, and

means for continuously adapting the addresses of the original bits in such a way that the address of the original bit having the maximum summed quality factor difference is assigned a given, constant and predetermined value so that said original bit will be used as the first original bit of a received bit, for synchronization whereby the received signal is automatically synchronized also at any one of said other possible transmission rates.

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**4,517,683**

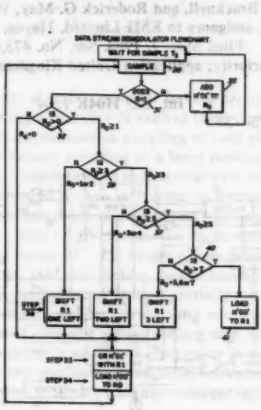
## MICROPROCESSOR CONTROLLED SYSTEM FOR DECODING SERIAL DATA INTO PARALLEL DATA FOR EXECUTION

**Fred W. Caspari, South Bend, Ind., assignor to Magnavox Consumer Electronics Company, Knoxville, Tenn.**

**Filed Dec. 31, 1981, Ser. No. 336,134**

**Int. Cl.³ H03K *13/24***

**U.S. Cl. 375—117** **12 Claims**



1. An apparatus for decoding remote control data comprising:

detector means for detecting a serial data stream containing said remote control data;

a microprocessor connected to receive said serial data stream, said microprocessor including the programming steps of:

(a) determining at a sample rate at least twice the data rate whether a binary one or zero is being received by the microprocessor;

(b) counting the number of consecutive samples of zero bits between each sample of a one bit; and

(c) inserting into a register data determined by said sampling and counting a zero bit being inserted each time said number of consecutive zero bits exceeds a constant N1, and a one is stored each time a one bit is sampled.

4,517,684

## METHOD OF AND ARRANGEMENT FOR PROVIDING NUMERICAL VALUES INDICATIVE OF RELATIONSIPS BETWEEN PULSE TRAIN PULSES

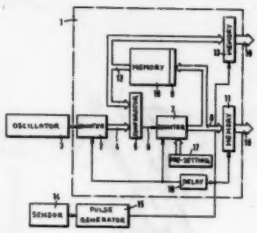
Helmut Fennel, Frankfurt am Main, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Mar. 18, 1983, Ser. No. 476,646

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1982, 3213800

Int. Cl.[3] G04F *10/04;* H03K *13/24*

U.S. Cl. 377—19 17 Claims




1. A method of providing numerical values indicative of relationships between consecutive pulse train pulses which may be separated by different time periods, comprising the steps of:

generating a series of clock pulses at intervals of constant length considerably shorter than that of any of the time periods separating the consecutive pulse train pulses;

counting said clock pulses commencing with the occurrence of the respective pulse train pulse to obtain an actual value of the time elapsed since such occurrence;

retrieving from a first of a plurality of storage locations having consecutive addresses and storing sequential reference values indicative of the elapsed time the reference value stored thereat which is indicative of the shortest elapsed time of interest, using the address of the first storage location;

comparing said retrieved reference value with said actual value until their coincidence;

advancing on such coincidence to the next consecutive storage location by using a next updated address of such storage location to retrieve the next reference value indicative of the next longer elapsed time therefrom;

repeating said comparing step using said next reference value, and said advancing step using the previously updated address, until the occurrence of the next following pulse train pulse; and

utilizing the last occurring address prior to the occurrence of such pulse train pulse for forming a numerical value indicative of the instantaneous frequency of the pulse train pulses.

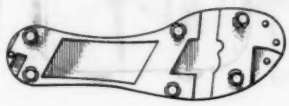
278,755
ATHLETIC BODY SUIT
Anita B. Jacobson, 300 E. 74th St., New York, N.Y. 10021
Filed Jan. 5, 1983, Ser. No. 455,810
Term of patent 14 years
U.S. Cl. D2—36

278,756
HAT
Jameel R. Hasan, 2121 Howard Ave., Flint, Mich. 48502
Filed Nov. 22, 1982, Ser. No. 443,547
Term of patent 14 years
U.S. Cl. D2—244

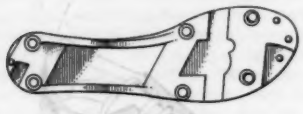
278,757
SPORT SHOE
Jonathan H. Werman, Peabody, Mass., assignor to The Keds Corporation, Cambridge, Mass.
Filed Nov. 1, 1982, Ser. No. 438,013
Term of patent 14 years
U.S. Cl. D2—309

278,758
SHOE UPPER
Martin Michaeli, Sarrebourg-Hoff, France, assignor to Chaussures Mephisto S.A., France
Filed Feb. 4, 1983, Ser. No. 463,950
Term of patent 14 years
U.S. Cl. D2—314

278,759
OUTSOLE FOR ATHLETIC SHOE
Edward J. Norton, Kingston, N.H.; Ronald L. Clay, West Boxford, and Zenon O. Smotrycz, Woburn, both of Mass., assignors to New Balance Athletic Shoe, Inc., Boston, Mass.
Filed Oct. 4, 1982, Ser. No. 432,529
Term of patent 14 years
U.S. Cl. D2—320



278,760
OUTSOLE FOR ATHLETIC SHOE
Edward J. Norton, Kingston, N.H.; Ronald L. Clay, West Boxford, and Zenon O. Smotrycz, Woburn, both of Mass., assignors to New Balance Athletic Shoe, Inc., Boston, Mass.
Filed Oct. 4, 1982, Ser. No. 432,530
Term of patent 14 years
U.S. Cl. D2—320



278,761
WATERPROOF BELT CONTAINER FOR PORTABLE RADIO OR TAPE PLAYER
Kip L. Fuller, Denver, Colo., assignor to Product Masters, Inc., Denver, Colo.
Filed Mar. 31, 1983, Ser. No. 482,232
Term of patent 14 years
U.S. Cl. D2—381

278,762
BELT BUCKLE WITH HIDDEN COMPARTMENTS
Genaro Texidor, Apt. 1F, 535 W. 135th St., New York, N.Y. 10031
Filed Oct. 12, 1982, Ser. No. 433,818
Term of patent 14 years
U.S. Cl. D2—394

278,763
EXPANDABLE BAG
James H. Allen, Covington, Ky., assignor to 'totes' incorporated, Loveland, Ohio
Division of Ser. No. 365,082, Apr. 2, 1982, abandoned, which is a continuation-in-part of Ser. No. 172,478, Jul. 25, 1980, abandoned. This application Apr. 6, 1983, Ser. No. 482,457
Term of patent 14 years
U.S. Cl. D3—71

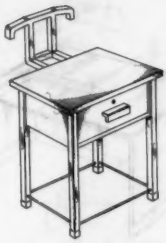
278,764
BATTERY OPERATED TOOTH BRUSH
Hans Olsen, Copenhagen, Denmark, assignor to Aktiebolaget Svensk Eldental, Falun, Sweden
Filed Jun. 30, 1982, Ser. No. 393,620
Term of patent 14 years
U.S. Cl. D4—101

278,765
TABLE
Lynn R. Crawford, Martinsville, Va., assignor to Dominion Industries, Inc., Collinsville, Va.
Filed Jan. 18, 1983, Ser. No. 458,805
Term of patent 14 years
U.S. Cl. D6—452

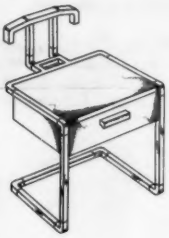
278,766
INFANT'S SAFETY SEAT
Robert E. Krume, 5056 Campo Rd., Woodland Hills, Calif. 91364
Filed Feb. 9, 1983, Ser. No. 465,248
Term of patent 14 years
U.S. Cl. D6—333

278,767
COMBINED CHAIR AND BOOKRACK
Roy D. Lundquist, Rte. 1, Luck, Wis. 54853
Filed Aug. 12, 1982, Ser. No. 407,358
Term of patent 14 years
U.S. Cl. D6—335

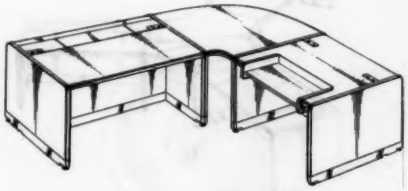
278,768
COMBINED COSTUMER AND STORAGE UNIT
Ronald W. Sharpe, 9465 Wilshire Blvd., Beverly Hills, Calif. 90212
Filed Feb. 18, 1983, Ser. No. 467,518
Term of patent 14 years
U.S. Cl. D6—414



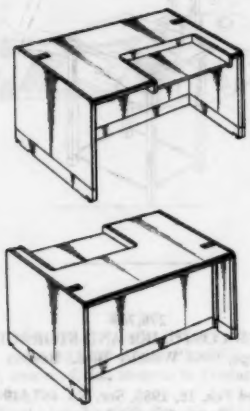
278,769
COMBINED COSTUMER AND STORAGE UNIT
Ronald W. Sharpe, 9465 Wilshire Blvd., Beverly Hills, Calif. 90212
Filed Feb. 18, 1983, Ser. No. 467,519
Term of patent 14 years
U.S. Cl. D6—414



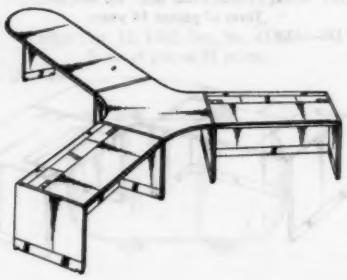
278,770
DESK
Seiji Koguma, Tokyo, Japan, assignor to Okamura Corporation, Yokohama, Japan
Filed Feb. 3, 1983, Ser. No. 463,393
Term of patent 14 years
U.S. Cl. D6—423



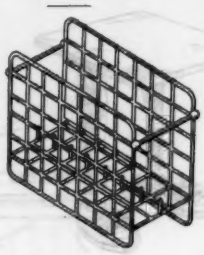
278,771
DESK
Seiji Koguma, Tokyo, Japan, assignor to Okamura Corporation, Yokohama, Japan
Filed Feb. 3, 1983, Ser. No. 463,391
Term of patent 14 years
U.S. Cl. D6—426



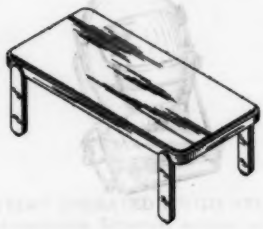
278,772
DESK
Seiji Koguma, Tokyo, Japan, assignor to Okamura Corporation, Yokohama, Japan
Filed Feb. 3, 1983, Ser. No. 463,394
Term of patent 14 years
U.S. Cl. D6—426



278,773
MAGAZINE RACK
Yaffa Licari, and Vito Licari, both of Elberon, N.J., assignors to Basic Line, Inc., Cliffwood Beach, N.J.
Filed Nov. 26, 1982, Ser. No. 444,810
Term of patent 14 years
U.S. Cl. D6—462



278,774
TABLE
Robert De Fuccio, Spinnerstown, Pa., assignor to Simmons Universal Corporation, New York, N.Y.
Filed Mar. 17, 1983, Ser. No. 476,084
Term of patent 14 years
U.S. Cl. D6—484

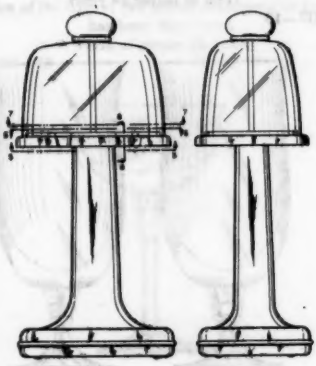


278,775
FURNITURE LEG OR SIMILAR ARTICLE
Arline Walpin, and Lionel A. Walpin, both of 9400 Brighton Way, Beverly Hills, Calif. 90110
Filed Feb. 4, 1983, Ser. No. 464,041
Term of patent 14 years
U.S. Cl. D6—495

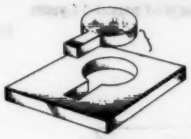
278,776
END STANDARD FOR A BENCH
James W. Kime, 95 Moonglow Dr., Birmingham, Ala. 35215
Filed Feb. 4, 1983, Ser. No. 463,804
Term of patent 14 years
U.S. Cl. D6—500

278,777
COMBINED BRACKET AND DISPOSABLE TOOTHBRUSH HOLDER
Edward J. Martin, 3388 Reedy Dr., Annandale, Va. 22003
Continuation-in-part of Ser. No. 409,267, Aug. 18, 1982, abandoned. This application Nov. 8, 1982, Ser. No. 440,245
Term of patent 14 years
U.S. Cl. D6—534

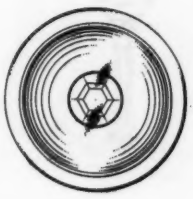
278,778
TOOTHBRUSH HOLDER
Jerry A. Brown, 3546 Newhouse Pl., Greenwood, Ind. 46142
Filed May 25, 1983, Ser. No. 498,120
Term of patent 14 years
U.S. Cl. D6—534



278,779
INVALID SEAT CUSHION
John B. Sink, 3729 Rolling Rd., High Point, N.C. 27260
Filed May 27, 1982, Ser. No. 382,784
Term of patent 14 years
U.S. Cl. D6—596



278,780
WINE GLASS
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,947
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13



278,781
**WINE GLASS**
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,948
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

278,782
**WATER GOBLET**
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,950
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

278,783
**WATER GOBLET**
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,984
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

278,784
CHAMPAGNE GLASS
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,985
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

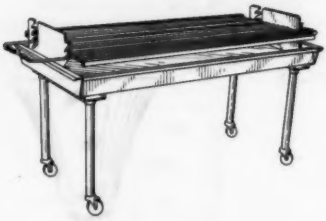
278,785
CHAMPAGNE GLASS
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,986
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

278,786
CORDIAL GLASS
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,988
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

278,787
CORDIAL GLASS
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,989
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

278,788
CORDIAL GLASS
Ben Seibel, New York, N.Y., assignor to American Commercial, Incorporated, Secaucus, N.J.
Filed Jul. 29, 1982, Ser. No. 402,990
The portion of the term of this patent subsequent to Apr. 9, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—13

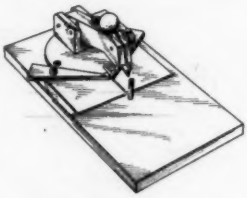
278,789
PORTABLE COOKING GRILL
Frank W. Beller, Aurora, Ill., assignor to Belson Manufacturing Co., Inc., Aurora, Ill.
Filed May 2, 1983, Ser. No. 490,703
Term of patent 14 years
U.S. Cl. D7—334



278,790
PUSH BLOCK FOR USE IN GUIDING WORK PIECES DURING CUTTING OPERATIONS
David B. Chaney, Powell, and Michael J. Duwell, Columbus, both of Ohio, assignors to Shopsmith, Inc., Dayton, Ohio
Filed Sep. 2, 1982, Ser. No. 414,132
Term of patent 14 years
U.S. Cl. D8—14

278,791
LEVERAGE TOOL SUPPORT MEMBER
Robert L. Stultz, P.O. Box 251, Magalia, Calif. 95954; James M. Angel, 1647 Young Ave., and Rodney Kopsa, 1765 Sparks Dr., both of Paradise, Calif. 95969
Filed Jul. 9, 1982, Ser. No. 396,710
Term of patent 14 years
U.S. Cl. D8—88

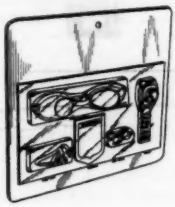
278,792
PICTURE FRAMING CUTTER
Richard E. Williams, 30 Walter Martin Ave., Ft. Walton Beach, Fla. 32548
Filed Jul. 14, 1982, Ser. No. 397,979
Term of patent 14 years
U.S. Cl. D8—98



278,793
IGNITION WIRE SEPARATOR FOR ENGINES
Richard J. Smith, Middleburg Heights; Lawrence S. Kuczynski, Cleveland, and Michael D. Stasko, Parma, all of Ohio, assignors to Mr. Gasket Company, Cleveland, Ohio
Filed Sep. 24, 1982, Ser. No. 423,036
Term of patent 14 years
U.S. Cl. D8—357

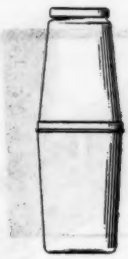
278,794
TRACK ROLLER CARRIAGE
Lance M. Vater, 9 Redounau Crescent, Wattle Park, South Australia, Australia (5066)
Filed Mar. 23, 1982, Ser. No. 360,956
Term of patent 14 years
U.S. Cl. D8—377

278,795
SWIMGEAR PACKAGE
Simon C. Fireman, Quincy, Mass., assignor to Aqua-Leisure Industries, Inc., Avon, Mass.
Filed Sep. 1, 1982, Ser. No. 413,885
Term of patent 14 years
U.S. Cl. D9—347



278,796
PLASTIC BOTTLE
Vincent E. Fortuna, Huntington Beach, Calif., assignor to Cosden Technology, Inc., Dallas, Tex.
Filed Jan. 6, 1983, Ser. No. 456,169
Term of patent 14 years
U.S. Cl. D9—349

278,797
PLASTIC BOTTLE
Vincent E. Fortuna, Huntington Beach, Calif., assignor to Cosden Technology, Inc., Dallas, Tex.
Filed Jan. 7, 1983, Ser. No. 456,189
Term of patent 14 years
U.S. Cl. D9—349



278,798
BOTTLE OR THE LIKE
Wallace E. Smith, 61 Meadow Brook Cir., Sudbury, Mass. 01776
Filed Aug. 26, 1982, Ser. No. 411,894
Term of patent 14 years
U.S. Cl. D9—352

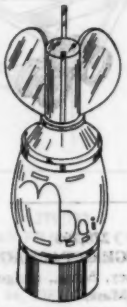
278,799
LIQUID CONTAINER
Walter P. Maynard, Jr., 3070 Presidential Dr., Suite 234, Atlanta, Ga. 30340
Filed Sep. 28, 1982, Ser. No. 425,877
Term of patent 14 years
U.S. Cl. D9—376

278,800
**PLASTIC PAINT CONTAINER**
Gary D. Bowen, Glens Falls, and James L. Bowen, Fort Ann, both of N.Y., assignors to Genpak Corporation, N.Y.
Filed Mar. 22, 1982, Ser. No. 360,855
Term of patent 14 years
U.S. Cl. D9—379

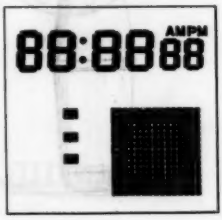
278,801
**TOOTH TIMER**
Leo E. Long, 745 Casita Way, Los Altos, Calif. 94022
Filed Sep. 30, 1982, Ser. No. 431,736
Term of patent 14 years
U.S. Cl. D10—40

278,802
**PORTABLE DISK DRIVE ALIGNMENT TESTER**
Bradley D. Baker, San Jose; Richard L. Kelly, Santa Clara, and George E. Meacham, Milpitas, all of Calif., assignors to Dysan Corporation, Santa Clara, Calif.
Filed Oct. 12, 1982, Ser. No. 433,946
Term of patent 14 years
U.S. Cl. D10—46

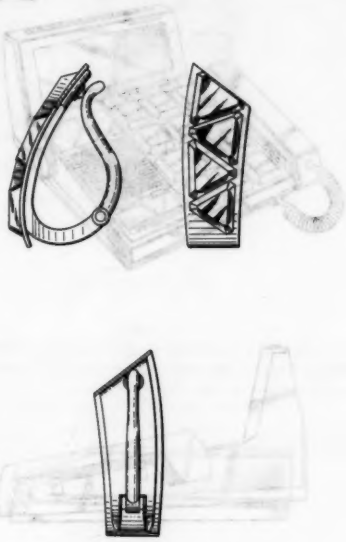
278,803
**BUOY**
Nick F. Leo, 27400 Garza, Saugus, Calif. 91350
Filed Dec. 16, 1982, Ser. No. 432,698
Term of patent 14 years
U.S. Cl. D10—107



278,804
**DESIGN FOR DISPLAY PANEL FOR ELECTRONIC TIMEPIECE**
Kenji Tanikawa, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan
Filed Jan. 18, 1982, Ser. No. 339,957
Claims priority, application Japan, Jul. 23, 1981, 56-32477
Term of patent 14 years
U.S. Cl. D10—125

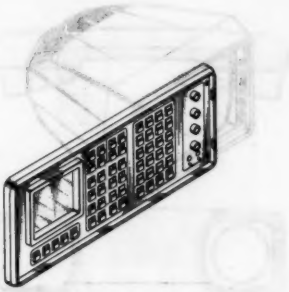


278,805
**EARCLIP**
Marina Bulgari, Athens, Greece, assignor to Marina B. Creation Limited, Vaduz, Liechtenstein
Filed Jun. 6, 1983, Ser. No. 501,374
Claims priority, application Italy, Dec. 6, 1982, 36195/82[U]
Term of patent 14 years
U.S. Cl. D11—40

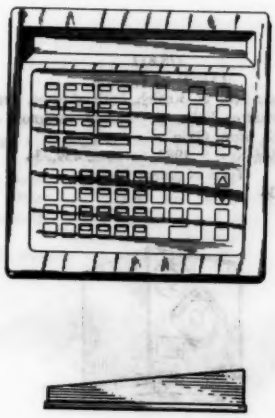


278,806
**TIRE**
Jay K. Lawrence, Mogadore, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed May 16, 1983, Ser. No. 495,279
Term of patent 14 years
U.S. Cl. D12—146

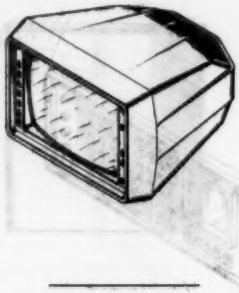
278,807
**FRONT PANEL FOR ELECTRONIC INSTRUMENT OR THE LIKE**
Nicholas A. Perna, El Toro, Calif., assignor to Kode, Inc., Tustin, Calif.
Filed Jul. 11, 1983, Ser. No. 512,485
Term of patent 14 years
U.S. Cl. D13—35



278,808
**PENDANT CONTROL UNIT**
William E. Donges, Lorain, Ohio, assignor to Nordson Corporation, Amherst, Ohio
Filed Oct. 7, 1983, Ser. No. 540,200
Term of patent 14 years
U.S. Cl. D13—12

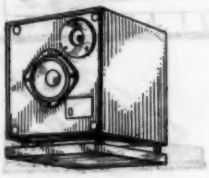


278,809
COMPUTER VIDEO DISPLAY MONITOR OR THE LIKE
William J. McLaughlin, Grass Valley, Calif., assignor to RGB Display Corporation, Grass Valley, Calif.
Filed Mar. 7, 1983, Ser. No. 472,806
Term of patent 14 years
U.S. Cl. D14—113

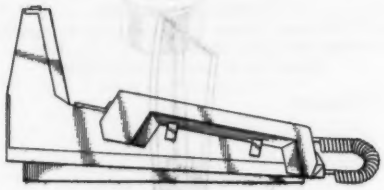


278,810
PHONOGRAPH
Patrick J. Murphy, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Jan. 27, 1983, Ser. No. 461,609
Term of patent 14 years
U.S. Cl. D14—17

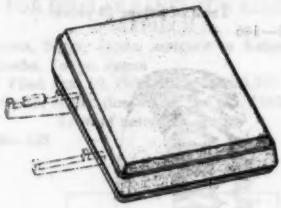
278,811
LOUD SPEAKER
Jeffrey N. White, Milo R. Kosich, both of Stow, and Norman Levenstein, Munroe Falls, all of Ohio, assignors to Audio-Technica, U.S., Stow, Ohio
Filed Nov. 5, 1982, Ser. No. 439,334
Term of patent 14 years
U.S. Cl. D14—34



278,812
COMBINATION TELEPHONE CLOCK AND RADIO SET
David Topp, Miami, Fla., assignor to Multi-Tech Industries Corp., Miami, Fla.
Filed Apr. 19, 1984, Ser. No. 601,965
Term of patent 14 years
U.S. Cl. D14—53

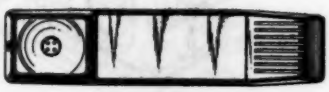


278,813
HOUSING FOR A TELEPHONE STAND OR SIMILAR ARTICLE
Donald M. Genaro, Haworth, N.J., and John N. McGarvey, Drexel Hill, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.
Division of Ser. No. 345,559, Feb. 4, 1982, , which is a continuation-in-part of Ser. No. 84,067, Oct. 12, 1979,. This application May 9, 1984, Ser. No. 608,579
Term of patent 14 years
U.S. Cl. D14—60

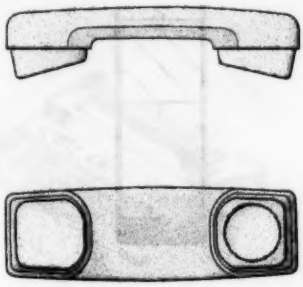


278,814
TELEPHONE STAND
Donald M. Genaro, Haworth, N.J.; Richard M. Joffe, Palisades Park, N.J., and John N. McGarvey, Drexel Hill, Pa., assignors to AT&T Technologies, Inc., Berkeley Heights, N.J.
Filed Aug. 29, 1984, Ser. No. 645,150
Term of patent 14 years
U.S. Cl. D14—60

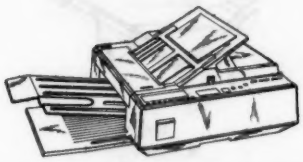
278,815
HOUSING FOR A TELEPHONE HANDSET
John K. Williams, Ipswich, England, assignor to British Telecommunications, London, England
Filed Sep. 24, 1982, Ser. No. 422,563
Claims priority, application United Kingdom, Mar. 29, 1982, 1005848
Term of patent 14 years
U.S. Cl. D14—63



278,816
HOUSING FOR TELEPHONE HANDSET
John N. McGarvey, Drexel Hill, Pa., and Alvin R. Tilley, Red Bank, N.J., assignors to AT&T Technologies, Inc., Berkeley Heights, N.J.
Filed Jul. 19, 1984, Ser. No. 632,186
Term of patent 14 years
U.S. Cl. D14—63

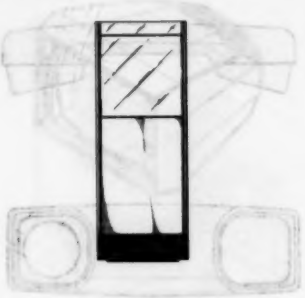


278,817
FACSIMILE TRANSCEIVER
Masaru Ohno, Chiba; Yoshiyuki Fujiyama, and Toshihiro Kumano, both of Nagano, all of Japan, assignors to Matsushita Graphic Communication System, Tokyo, Japan
Filed Jan. 3, 1983, Ser. No. 455,384
Claims priority, application Japan, Jul. 5, 1982, 57-30255
Term of patent 14 years
U.S. Cl. D14—94

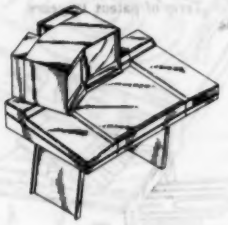


278,818
KEYBOARD FOR ELECTRONIC COMPUTERS
Nobuhisa Aoyama, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Japan
Filed Mar. 2, 1983, Ser. No. 471,319
Claims priority, application Japan, Sep. 3, 1982, 57-39998
Term of patent 14 years
U.S. Cl. D14—100

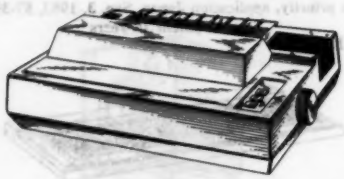
278,819
COMPUTER HOUSING
William A. Hommowun, Hanover Park, Ill.; Justin M. Maguire, Jr., Maplewood, N.J., and Gordon E. Sylvester, Jamaica, N.Y., assignors to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Jul. 2, 1982, Ser. No. 394,823
Term of patent 14 years
U.S. Cl. D14—102



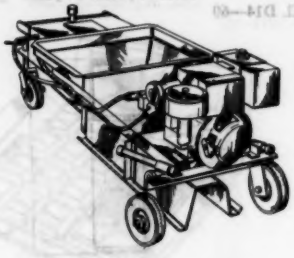
278,820
PAGE PLANNING TABLE WITH DISPLAY MONITOR
Michael B. Woodhall, Slough, England, assignor to Crosfield Electronics Limited, London, England
Filed Dec. 3, 1982, Ser. No. 446,686
Claims priority, application United Kingdom, Jun. 4, 1982, 1007106
Term of patent 14 years
U.S. Cl. D14—103



278,821
ELECTRONIC PRINTER
Naoyuki Maruyama, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha and Epson Corp., both of Tokyo, Japan
Filed Dec. 3, 1982, Ser. No. 446,826
Claims priority, application Japan, Jun. 4, 1982, 57-24663
Term of patent 14 years
U.S. Cl. D14—111

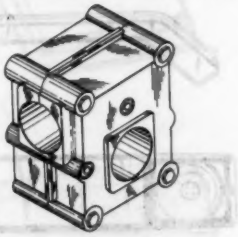


278,822
SELF-POWERED CURBING MACHINE
W. Harold Neal, 122 Dunwoody Dr., Carrollton, Ga. 30117
Filed Apr. 4, 1983, Ser. No. 481,895
Term of patent 14 years
U.S. Cl. D15—22



278,823
OVERLOCK STITCH SEWING MACHINE
Yoshihide Yoneda, Hirakata, Japan, assignor to Maruzen Sewing Machine Co., Ltd., Osaka, Japan
Filed Sep. 28, 1982, Ser. No. 426,072
Term of patent 14 years
U.S. Cl. D15—69

278,824
GEARBOX HOUSING
Warren G. Votaw, Denver, Colo., assignor to Emerson Electric Co., St. Louis, Mo.
Filed Nov. 5, 1982, Ser. No. 439,509
Term of patent 14 years
U.S. Cl. D15—149

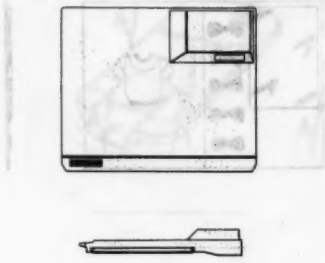


278,825

**DOCUMENT FEEDER FOR COPYING MACHINE**

Yasuhiro Saito, Tokyo; Tetsuya Goto, and Toshio Umino, both of Kanagawa, all of Japan, assignors to Ricoh Company, Ltd., Japan

Filed Sep. 17, 1982, Ser. No. 419,531
Claims priority, application Japan, Mar. 18, 1982, 57-011148
Term of patent 14 years
U.S. Cl. D16—32



278,826

**SUNGLASSES**

Jean-Pierre Lamy, 49 Rue du Rhone, 1204 Geneva, Switzerland

Filed Feb. 29, 1984, Ser. No. 584,799
Term of patent 14 years
U.S. Cl. D16—102

278,827

**TYPEWRITER**

Toshiaki Funato; Masayuki Morishita, and Masafumi Itoh, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jul. 6, 1983, Ser. No. 511,314
Claims priority, application Japan, Jan. 11, 1983, 58-512
Term of patent 14 years
U.S. Cl. D18—1

278,828

**TYPEWRITER**

Toshiaki Funato; Masayuki Morishita, and Masafumi Itoh, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jul. 6, 1983, Ser. No. 511,340
Claims priority, application Japan, Jan. 11, 1983, 58-505
Term of patent 14 years
U.S. Cl. D18—1

278,829

**TYPEWRITER**

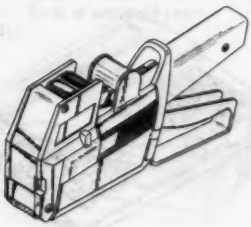
Toshiaki Funato; Masayuki Morishita, and Masafumi Itoh, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jul. 6, 1983, Ser. No. 511,343
Claims priority, application Japan, Jan. 11, 1983, 58-502
Term of patent 14 years
U.S. Cl. D18—1

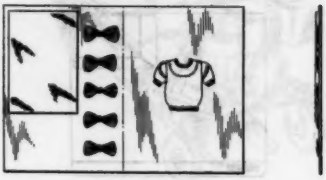
278,830
TYPEWRITER
Toshiaki Funato; Masayuki Morishita, and Masafumi Itoh, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan
Filed Jul. 6, 1983, Ser. No. 511,345
Claims priority, application Japan, Oct. 11, 1983, 58-506
Term of patent 14 years
U.S. Cl. D18—1

278,831
PAPER AND DOCUMENT HANDLING AND COUNTING APPARATUS
Peter Bressler, Philadelphia, Pa., and Peter Byar, Willingboro, N.J., assignors to Brandt, Inc., Watertown, Wis.
Filed Sep. 15, 1982, Ser. No. 418,562
Term of patent 14 years
U.S. Cl. D18—3

278,832
LABELER
Tokio Wada, Nagareyamashi, Japan, assignor to Kabushiki Kaisha Shinsei Industries, Tokyo, Japan
Filed Oct. 20, 1982, Ser. No. 438,366
Claims priority, application Japan, Apr. 20, 1982, 57-17061
Term of patent 14 years
U.S. Cl. D18—19



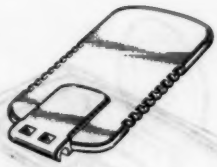
278,833
COMBINED DISPLAY AND INFORMATION CARD FOR FABRICS AND YARNS OR THE LIKE
Lucey Harley, 185 E. 83rd St., New York, N.Y. 10028
Filed Mar. 8, 1982, Ser. No. 355,519
Term of patent 14 years
U.S. Cl. D19—1



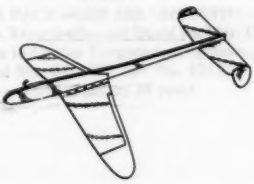
278,834
SET OF MOLECULAR MODEL CONSTRUCTION PIECES
Kazuhisa Satoh, 10-24, Megurohoncho, 1-chome, Meguro-ku, Tokyo 152, Japan
Filed Apr. 21, 1982, Ser. No. 370,198
Term of patent 14 years
U.S. Cl. D19—62

278,835
SHOPPING MEMO HOLDER
James R. Dunn, Fairfield, Conn., assignor to Coats & Clark, Inc., Stamford, Conn.
Filed Jan. 20, 1983, Ser. No. 459,677
Term of patent 14 years
U.S. Cl. D19—91

278,836
IDENTIFICATION TAG
William P. Flies, Burnsville, Minn., assignor to Datakey, Inc., Burnsville, Minn.
Filed Feb. 28, 1983, Ser. No. 470,211
Term of patent 14 years
U.S. Cl. D20—22



278,837
TOY AIRPLANE
Yasuaki Ninomiya, Suite 5-101 Tamaplaza, 20 Utsukushigaoka, 1-chome, Midoriku, Yokohama, Kanagawa, Japan
Filed Nov. 15, 1982, Ser. No. 441,653
Claims priority, application Japan, May 28, 1982, 57-23520
Term of patent 14 years
U.S. Cl. D21—89

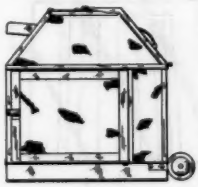


278,838
ANIMAL-LIKE FIGURE TOY
Tethuo Ohkado, Tokyo, Japan, assignor to Tomy Kogyo Company, Incorporated, Japan
Filed Aug. 13, 1982, Ser. No. 407,891
Claims priority, application Japan, Aug. 25, 1981, 56-37330
Term of patent 14 years
U.S. Cl. D21—150

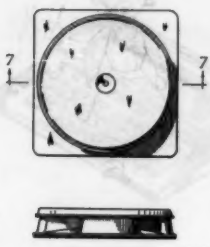
278,839
PLUSH TOY ANIMAL FIGURE
Gucki Mulally, 33 Grennwich Ave., New York, N.Y. 10014
Filed Aug. 4, 1982, Ser. No. 405,202
Term of patent 14 years
U.S. Cl. D21—159

278,840
WEIGHTED VEST
Edith Winston, 135 Hazelwood Dr., Jericho, N.Y. 111753
Filed Oct. 21, 1983, Ser. No. 544,075
Term of patent 14 years
U.S. Cl. D21—191

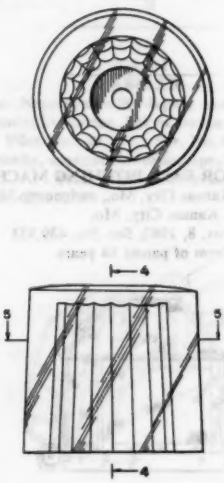
278,841
HOUSING FOR BALL PITCHING MACHINE
Paul S. Giovagnoli, Kansas City, Mo., assignor to Master Pitching Machine, Inc., Kansas City, Mo.
Filed Nov. 8, 1982, Ser. No. 439,923
Term of patent 14 years
U.S. Cl. D21—210



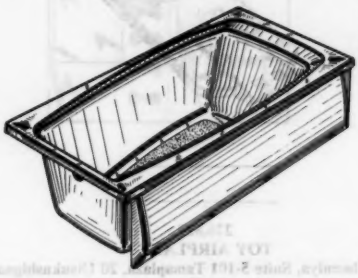
278,842
INSECT FEEDING STATION OR SIMILAR ARTICLE
Keith Woodruff, Mountainside, N.J., assignor to American Cyanamid Company, Stamford, Conn.
Filed Nov. 5, 1982, Ser. No. 439,137
Term of patent 14 years
U.S. Cl. D22—19




278,843
FAUCET HANDLE
James E. Niemann, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.
Continuation-in-part of Ser. No. 169,538, Jul. 17, 1980,. This application Mar. 11, 1982, Ser. No. 357,018
The portion of the term of this patent subsequent to Jul. 12, 1997, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—28




278,844
BATHTUB
Henry M. Stairs, Jr., Neshanic, N.J., assignor to American Standard Inc., New York, N.Y.
Filed Aug. 11, 1983, Ser. No. 522,084
Term of patent 14 years
U.S. Cl. D23—55



278,845
COMBINED TOILET SEAT AND COVER
David E. Harrison, and George N. Sanderson, both of Columbus, Miss., assignors to Sanderson Plumbing Products, Inc., Columbus, Miss.
Filed Jun. 14, 1982, Ser. No. 389,453
Term of patent 14 years
U.S. Cl. D23—71

278,846

**COMBINED TOILET SEAT AND COVER**

David E. Harrison, and George N. Sanderson, both of Columbus, Miss., assignors to Sanderson Plumbing Products, Inc., Columbus, Miss.

Filed Jun. 14, 1982, Ser. No. 389,454

Term of patent 14 years

U.S. Cl. D23—71

278,847

**CASING FOR A PACKAGED AIR CONDITIONING UNIT**

Walter W. Hoyle, Fayetteville, and David Barkley, Clay, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Sep. 29, 1982, Ser. No. 426,333

Term of patent 14 years

U.S. Cl. D23—144

278,848

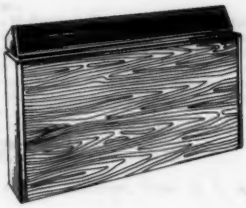
**FAN COIL UNIT FOR AN AIR CONDITIONING SYSTEM**

Walter W. Hoyle, Fayetteville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Sep. 29, 1982, Ser. No. 427,206

Term of patent 14 years

U.S. Cl. D23—144



278,849

**MOULD TRAY FOR DENTAL MODELS**

Steven Hoyle, Brighouse, England, assignor to M. Gill Limited, West Yorkshire, England

Filed May 24, 1982, Ser. No. 381,651

Claims priority, application United Kingdom, Dec. 9, 1981, 1004079

Term of patent 14 years

U.S. Cl. D24—10

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 14TH DAY OF MAY, 1985

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See*—
Schollmeier, Charles E., 4,517,021, Cl. 127-30.000.
Yackel, Walter C., Jr.; and Hebenstreit, William E., 4,517,218, Cl. 426-656.000.

A. J. Antunes & Co.: *See*—
Miller, Dye O., 4,516,485, Cl. 99-339.000.

Abbott Laboratories: *See*—
Nakatani, Keiichi, 4,517,313, Cl. 521-51.000.
Popelka, Susan R., 4,516,856, Cl. 356-368.000.

Abe, Katsuo: *See*—
Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, 4,517,444, Cl. 219-216.000.

Abe, Takao: *See*—
Shirota, Norihisa; and Abe, Takao, 4,517,552, Cl. 340-347.0DD.

Abe, Yoshiaki; Nishimura, Yutaka; and Sugimoto, Hitoshi, to Diesel Kiki Co., Ltd. Circuit for controlling glow plug energization. 4,516,543, Cl. 123-179.00H.

Ace Pak Company Incorporated: *See*—
Nakajima, Mutsuhiko, 4,516,381, Cl. 53-375.000.
Nakajima, Mutsuhiko, 4,516,382, Cl. 53-375.000.

Ace Pest & Termite Control Co.: *See*—
Agron, Michael H.; Buch, James R.; and LaVoie, Robert E., 4,517,557, Cl. 340-540.000.

Acheson Industries, Inc.: *See*—
Stoetzer, Steven R., 4,517,118, Cl. 252-513.000.

Acomb, Byron H., to Union Carbide Corporation. Gas pressure reducing regulator and adapter. 4,516,595, Cl. 137-73.000.

Adachi, Hiromi; and Iwaya, Shoichi, to Mitsubishi Denki Kabushiki Kaisha; and TDK Electronics Co., Ltd. Lighting apparatus for a discharge lamp. 4,517,496, Cl. 315-227.00R.

Adamik, Jaroslav, to San Shoe Trading Corp. Means for displaying a picture or the like in a shoe. 4,516,337, Cl. 36-136.000.

Adrian, Renate: *See*—
Merkenich, Karl; Wasel-Nielen, Horst-Dieter; Maurer, Alexander; and Adrian, Renate, 4,517,109, Cl. 252-135.000.

Advance Transformer Co.: *See*—
Crawford, Joseph A., 4,517,498, Cl. 315-323.000.

Advanced Cardiovascular Systems, Inc.: *See*—
Samson, Wilfred J., 4,516,972, Cl. 604-282.000.

Advanced Graphic Technology: *See*—
Arnold, Raymond M., 4,517,044, Cl. 156-277.000.

Advanced Micro Devices, Inc.: *See*—
Haskell, Jacob D., 4,516,316, Cl. 29-576.00W.

AFA Corporation, The: *See*—
Garneau, Richard P., 4,516,695, Cl. 222-153.000.

Agarwal, Pawan K.; Lundberg, Robert D.; Wagensomer, Joseph; and Jagiesch, Frank C., to Exxon Research and Engineering Co. Emulsion type adhesive compositions. 4,517,250, Cl. 428-483.000.

Agarwal, Shashi B.: *See*—
Nickola, Richard A.; and Agarwal, Shashi B., 4,517,229, Cl. 427-383.900.

Agency of Industrial Science and Technology: *See*—
Suzuki, Hiroshi; Gama, Yasuo; and Miyazaki, Shoji, 4,517,110, Cl. 252-180.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Stahl, Werner; and Muller, Jurgen, 4,516,763, Cl. 271-11.000.

Agrawal, Suphal P., to Northrop Corporation. Methods of enhancing superplastic formability of aluminum alloys by alleviating cavitation. 4,516,419, Cl. 72-60.000.

Agron, Michael H.; Buch, James R.; and LaVoie, Robert E., to Ace Pest & Termite Control Co. Alarm housing for rodent control device. 4,517,557, Cl. 340-540.000.

Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., to Data General Corporation. Digital computer system having unique means of referring to operands and ability to execute a plurality of internal languages. 4,517,642, Cl. 364-200.000.

Aihara, Shigenobu; and Yamada, Akio, to NEC Corporation. Waveguide amplifier circuit. 4,517,527, Cl. 330-287.000.

Airmaster Fan Company: *See*—
Breining, Frank E., 4,517,481, Cl. 310-71.000.

Ain Seiki Kabushiki Kaisha: *See*—
Nishikawa, Masumi, 4,516,440, Cl. 74-493.000.
Ochiai, Chiaki, 4,516,474, Cl. 91-519.000.

Aizawa, Iwao; and Masuda, Michio, to Hitachi, Ltd. Synchronizing signal generating circuit for solid-state color video camera. 4,517,587, Cl. 358-17.000.

Akashi, Shunji: *See*—
Yoshida, Hiroshi; Akashi, Shunji; and Kuse, Kazuki, 4,516,304, Cl. 29-408.000.

Akers, David D.: *See*—
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.

Akiyama, Yoshinori; Nishimura, Shinichi; and Harigaya, Isamu, to Nissan Motor Company, Ltd.; and Ohi Seisakusho Company, Ltd. Slider mechanism for a vehicle seat. 4,516,811, Cl. 308-3.00R.

Aktiebolaget Bofors: *See*—
Bergfalk, Bjorn, 4,516,646, Cl. 177-211.000.

Aktiebolaget Electrolux: *See*—
Eknor, Per O. E., 4,516,696, Cl. 222-181.000.

Akzo nv: *See*—
Kik, Leendert A.; and Schuurink, Pieter H. J., 4,517,248, Cl. 428-457.000.

ALB Klein GmbH & Co. KG: *See*—
Stolpp, Siegfried, 4,516,894, Cl. 414-5.000.

Albers, Daniel C.: *See*—
Richardson, Paul; Albers, Daniel C.; and Whitley, David A., 4,516,633, Cl. 166-69.000.

Albert, Robert J., to Tubular Threading Incorporated. Semi-automatic pipe threading plant and apparatus therefor. 4,516,306, Cl. 29-564.700.

Albini & Fontanot S.p.A.: *See*—
Molinazzi, Roberto, 4,516,367, Cl. 52-182.000.

Alcon Laboratories, Inc.: *See*—
York, Billie M., Jr., 4,517,199, Cl. 514-392.000.

Alcorn, William W.: *See*—
Beaulieu, Roger D.; Alcorn, William W.; and Matychowiak, David S., 4,516,363, Cl. 52-90.000.

Alderton, Geoffrey W.; and Davidge, Peter C., to British Nuclear Fuels Limited. Centrifuges, centrifuge plants and flow control arrangements therefor. 4,516,966, Cl. 494-1.000.

Aldrich, Deborah G., to Nabisco Brands, Inc. Co-deposited two-component hard candy. 4,517,205, Cl. 426-103.000.

Aldwinckle, Herb S.: *See*—
Cummins, James N.; Aldwinckle, Herb S.; and Byers, Ross E., 4,516,353, Cl. 47-58.000.

Aleem, Mohd A.; and Krinickas, Alexander, Jr., to Sundstrand Corporation. Generator armature cooling and air gap sealing system. 4,517,479, Cl. 310-54.000.

Alexander, Kenneth E.; and Marshall, Robert J., to GTE Products Corporation. Motor vehicle headlight with adhesive accumulation means. 4,517,629, Cl. 362-267.000.

Alexander, Michael P.: *See*—
Kaltz, Milton C.; Alexander, Michael P.; and Cichoski, Richard, 4,516,803, Cl. 296-107.000.

Alfa-Laval, Inc.: *See*—
Schultz, Per-Erik; Chowdhury, Mofazzal H.; and Neff, Clayton B., 4,516,592, Cl. 134-169.00C.

Alfonso Bialetti & C., Fonderia in Conchiglia S.p.A.: *See*—
De Ponti, Luigi, 4,516,484, Cl. 99-279.000.

Algieri, Aldo A.: *See*—
Crenshaw, Ronnie R.; and Algieri, Aldo A., 4,517,366, Cl. 546-231.000.

Aliberto, Anthony C.; and Silberberg, Joseph, to General Electric Company. Blend of impact modifier, vinyl chloride polymer, and glassy amorphous polymer. 4,517,339, Cl. 525-85.000.

Allard, Edward F. Sound suppression of engine noise. 4,516,657, Cl. 181-204.000.

Allegheny Ludlum Steel Corporation: *See*—
Andersen, Poul, 4,516,736, Cl. 242-56.200.

Allen, Michael D.; and Van Voorhis, John E., to Sprague Electric Company. Solid electrolyte capacitor anode assembly. 4,517,626, Cl. 361-433.000.

Alliflex International Limited: *See*—
Scott, Michael J.; Slater, Paul; and Brooshooft, Lawrence H., 4,516,577, Cl. 128-330.000.

Allibert S.A.: *See*—
Hemery, Andre, 4,517,136, Cl. 264-25.000.

Allied Corporation: *See*—
Anello, Louis G.; Van Der Puy, Michael; Hendrickson, Larry L.; Rogic, Milorad M.; Swerdloff, Michael D.; and Kolc, Jaroslav F., 4,517,002, Cl. 71-28.000.
Carey, Desmond F., 4,516,427, Cl. 73-505.000.
Hopkins, Ronald J.; Thomas, Evan G.; and Kieta, Harold J., 4,517,106, Cl. 252-79.400.
Ivory, Dawn M.; Miller, Granville G.; Chance, Ronald R.; and Baughman, Ray H., 4,517,116, Cl. 252-500.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,003, Cl. 71-28.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,005, Cl. 71-28.000.

May, Joseph R.; Petruccelli, Frank; Lang, Robert L.; and de Haan, Herman P., 4,517,231, Cl. 428-35.000.
Swerdloff, Michael D.; Kolc, Jaroslav F.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,004, Cl. 71-28.000.
Swerdloff, Michael D.; Kolc, Jaroslav F.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,007, Cl. 71-28.000.

Allred, David D.: *See—*
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., 4,517,223, Cl. 427-39.000.

Allway Tools, Inc.: *See—*
Gringer, Donald; and Soled, Howard, 4,516,360, Cl. 51-384.000.
Gringer, Donald, 4,516,361, Cl. 51-392.000.

Alpert, Andrew J. Chromatographic support material. 4,517,241, Cl. 428-332.000.

Alpha-Omega Engineering, Inc.: *See—*
Smith, Stephen F., 4,517,534, Cl. 333-14.000.

Alpine Plastics Machinery Limited: *See—*
Hall, Arthur, 4,516,895, Cl. 414-43.000.

Alps Electric Co., Ltd.: *See—*
Sugawara, Fukuo, 4,517,576, Cl. 346-139.00R.
Tobita, Katsumi, 4,517,595, Cl. 358-114.000.

Alten, Kurt. Seal for the gap between the edge of a building opening and the back end of a vehicle driven up to it. 4,516,366, Cl. 52-173.0DS.

Altmann, Konrad, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Stable optical laser resonator. 4,517,677, Cl. 372-99.000.

Aluminum Company of America: *See—*
Francis, Thomas L.; and Phelps, Frankie E., 4,517,037, Cl. 156-89.000.
Laemmle, Joseph T.; and Bohaychick, John, 4,517,105, Cl. 252-56.00R.

Aluminum Metals, Inc.: *See—*
Carden, Lloyd E., 4,516,362, Cl. 52-75.000.

Amano Pharmaceutical Co., Ltd: *See—*
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, 4,517,180, Cl. 514-16.000.

AMAX Inc.: *See—*
Hodges, Donald R.; and Sherwood, William G., 4,517,058, Cl. 204-4.000.

Amchem Products, Inc.: *See—*
Plante, Stuart E.; and Hess, Susan V., 4,517,025, Cl. 134-38.000.

AMECA S.r.l.: *See—*
Boccaletti, Pietro, 4,516,503, Cl. 104-3.000.

Ameco Corporation: *See—*
Chmela, Andrew, 4,517,433, Cl. 219-75.000.

American Cyanamid Company: *See—*
Chidester, Dale H., 4,517,473, Cl. 307-269.000.

American District Telegraph Co.: *See—*
Marsocci, Angelo A.; and Schuchard, Walter F., 4,517,555, Cl. 340-522.000.

American Hoechst Corporation: *See—*
Knopf, William H., 4,517,145, Cl. 264-40.200.

American Hospital Supply Corp.: *See—*
Giegel, Joseph L.; and Brotherton, Mary M., 4,517,288, Cl. 435-7.000.

American Standard Inc.: *See—*
Parrock, Joseph J., 4,516,417, Cl. 70-384.000.

AMF Incorporated: *See—*
Campbell, Sterrett P., 4,517,212, Cl. 426-496.000.

Amick, Christopher G.: *See—*
Petrich, Dennis M.; Amick, Christopher G.; and Gruenenwald, Stanley L., 4,517,512, Cl. 324-73.00R.

Amikura, Takashi: *See—*
Suzuki, Ryoichi; Matsumoto, Seiichi; Amikura, Takashi; Tsunekawa, Tokuichi; and Uchiyama, Takashi, 4,516,835, Cl. 350-336.000.

Amiot, Bruce P.; Fuller, Larry E.; Martinez, Felix J.; Cosentino, Louis C.; Harm, William H.; and Nelson, Wayne L., to Renal Systems, Inc. Dialyzer reuse machine. 4,517,081, Cl. 210-85.000.

AMP Incorporated: *See—*
Clark, Donald G., 4,516,309, Cl. 29-564.400.
Fisher, Howard Z., 4,517,234, Cl. 428-119.000.
Pegram, Warren J., 4,517,408, Cl. 174-153.00G.
Wolfel, Lee A., 4,516,822, Cl. 339-103.00M.

Amstar Corporation: *See—*
Dixon, Thomas, 4,517,572, Cl. 343-876.000.

Ancher, Jean-Francois R.; Bourgery, Guy R.; Dostert, Philippe L.; Douzon, Colette A.; Guerret, Patrick G.; Lacour, Alain P.; and Langlois, Michel, to Delalande S.A. -N-substituted phenyl-5-methoxymethyl-2-oxazolidinones and pharmaceutical compositions containing same. 4,517,197, Cl. 514-376.000.

Anchor Continental Inc.: *See—*
Bell, John E., 4,516,976, Cl. 604-389.000.

Anderlohr, Axel: *See—*
Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 568-885.000.

Andersen, Poul, to Allegheny Ludlum Steel Corporation. Method and apparatus for slitting metal strip. 4,516,736, Cl. 242-56.200.

Anderson, Martin, to Shell Oil Company. Pesticidal benzoylurea compounds. 4,517,193, Cl. 514-471.000.

Anderson, Richard N.: *See—*
Gaillard, Adrianus J. C.; and Anderson, Richard N., 4,516,300, Cl. 29-24.500.

Andersson, Alf H. Apparatus for planting seeds in drills at predetermined intervals. 4,516,690, Cl. 221-233.000.

Ando, Hideo; Kiyama, Kentaro; and Kitano, Kyozo, to Lion Corporation. Process for removal of unreacted oil from surfactant slurry. 4,517,113, Cl. 252-353.000.

Ando, Hideo, to Tokyo Shibaura Denki Kabushiki Kaisha. Optical head. 4,517,666, Cl. 369-45.000.

Ando Parachemie Co., Ltd.: *See—*
Tadashi, Ii; and Saichi, Egusa, 4,517,018, Cl. 75-129.000.

Andreen, John F. Internal combustion engine. 4,516,539, Cl. 123-53.00R.

Andrews, Angus P., to United States of America, Army. Monolitic band-pass filter using piezoelectric cantilevers. 4,517,486, Cl. 310-331.000.

Anello, Louis G.; Van Der Puy, Michael; Hendrickson, Larry L.; Rogic, Milorad M.; Swerdloff, Michael D.; and Kolc, Jaroslav F., to Allied Corporation. Phosphorodiamide urease inhibitors and urease inhibited urea based fertilizer compositions. 4,517,002, Cl. 71-28.000.

Anic S.p.A.: *See—*
Mercati, Giorgio; Mariano, Armando; Pertot, Fulvio; Glionna, Antonio; and Ferri, Mario, 4,517,355, Cl. 528-287.000.

Anton Piller GmbH & Co. KG: *See—*
Sachs, Klaus, 4,517,471, Cl. 307-67.000.

Anzai, Max I.: *See—*
Lin, Frank W.; Moon, Suhdok D.; Van, Tri S.; and Anzai, Max I., 4,517,503, Cl. 318-561.000.

Anzai, Nobuo; and Ikejima, Hiroyuki, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for controlling an A-C powered elevator. 4,516,664, Cl. 187-29.00R.

Aoki, Masanori: *See—*
Yamanaka, Koichi; Gotoh, Tetsuro; Aoki, Masanori; Kataoka, Isao; and Nishiwaki, Shunro, 4,517,091, Cl. 210-512.100.

Aoki, Takashi: *See—*
Nishikawa, Masao; Aoki, Takashi; Sakai, Shinzo; and Yoshizawa, Hiroshi, 4,516,671, Cl. 192-.076.

Aoki, Toshiyuki: *See—*
Hosji, Kunihiko; and Aoki, Toshiyuki, 4,517,504, Cl. 318-568.000.

Aoki, Yoshiaki; Suzuki, Hazime; and Hirota, Tatsuya, to Sanyo Electric Co., Ltd. Clothes dryer. 4,516,335, Cl. 34-133.000.

Aoyoma, Shunichi; and Kato, Manabu, to Nissan Motor Co., Ltd. Valve operation changing system of internal combustion engine. 4,516,542, Cl. 123-90.160.

Appropriate Technology Corporation: *See—*
Gardner, Bruce C.; Ingold, Daniel L.; and May, David A., 4,516,618, Cl. 160-120.000.

APX Group, Inc.: *See—*
Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., 4,516,659, Cl. 181-243.000.

Arai, Mamoru: *See—*
Manome, Taichi; Ohmine, Toshinori; Okazaki, Takao; and Arai, Mamoru, 4,517,300, Cl. 435-317.000.

Arakawa, Tetsuo; and Nagahiro, Kenichi, to Honda Giken Kogyo Kabushiki Kaisha. Intake manifold for internal combustion engines. 4,516,538, Cl. 123-52.00M.

Arao, Kozo: *See—*
Shimizu, Isamu; and Arao, Kozo, 4,517,269, Cl. 430-57.000.

ARC Rebuilders, Inc.: *See—*
Hayes, Williiam; and Dohrenwend, James W., 4,517,083, Cl. 210-131.000.

Arcair Company: *See—*
Sadauskas, Raymond L.; and Moore, Paul E., 4,517,440, Cl. 219-145.100.

Archival Color Technologies: *See—*
Berger, Charles; and Ruth, Kenneth, 4,517,267, Cl. 430-3.000.

Arfert, Horst F. W., to Reynolds Metals Company. Method and apparatus for packaging containers. 4,516,383, Cl. 53-410.000.

Arikawa, Junichi: *See—*
Kokubo, Eiichi; Arikawa, Junichi; Goi, Kowichi; and Imura, Shinichi, 4,517,451, Cl. 235-379.000.

Arikawa, Tetsuro: *See—*
Harada, Atsumu; and Arikawa, Tetsuro, 4,517,647, Cl. 364-426.000.

Armstrong World Industries, Inc.: *See—*
Ashley, John C.; and Calhoun, Bernard, 4,516,298, Cl. 26-3.000.

Arnaud, Johnny, to Hydrotreat, Inc. Method and apparatus for constructing filter element. 4,517,089, Cl. 210-488.000.

Arndt, Friedrich: *See—*
Skotsch, Carlo; Baumert, Dietrich; Krahmer, Hansjorg; and Arndt, Friedrich, 4,517,367, Cl. 546-276.000.

Arndt, Peter J.; Muller, Manfred; Schlosser, Fritz; and Wenzel, Franz, to Rohm GmbH. Method for purifying methacrylamidopropyl trimethylammonium chloride and related compounds. 4,517,380, Cl. 564-206.000.

Arneklev, Duane R.: *See—*
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,517,012, Cl. 71-94.000.

Arnold, Raymond M., to Advanced Graphic Technology. Dry transfer decal and method of manufacture. 4,517,044, Cl. 156-277.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Katsumata, Tsutomu; and Yokota, Masahisa, 4,517,389, Cl. 568-804.000.

Asahi Yukizai Kogyo Co., Ltd.: *See—*
Ueda, Tomoyuki, 4,516,597, Cl. 137-314.000.

Asakura, Osamu: *See—*
Fushimoto, Hideo; Toyomura, Shigeru; Nishimuro, Yoshiaki; Asakura, Osamu; and Rachi, Masahiro, 4,517,660, Cl. 364-708.000.

ASC Incorporated: *See*—
Kaltz, Milton C.; Alexander, Michael P.; and Cichoski, Richard, 4,516,803, Cl. 296-107.000.
Aschoff, Hans-Joachim; and Cholewa, Lothar, to Vorwerk & Co. Interholding GmbH. Load monitoring circuit for electric motors. 4,517,502, Cl. 318-474.000.
Ashland Oil, Inc.: *See*—
Biegen, James R., 4,517,222, Cl. 427-30.000.
Ashley, John C.; and Calhoun, Bernard, to Armstrong World Industries, Inc. Cane singeing apparatus. 4,516,298, Cl. 26-3.000.
AT&T Bell Laboratories: *See*—
Brown, James M., 4,517,513, Cl. 324-117.00R.
AT&T Technologies, Inc.: *See*—
Gliwa, William F.; and Kalina, Robert F., 4,516,737, Cl. 242-77.000.
Kanotz, William M., 4,516,922, Cl. 425-113.000.
Kirschenman, Duane L., 4,516,318, Cl. 29-846.000.
Paek, Un-Chul, 4,516,826, Cl. 350-96.310.
Venable, Edward R., 4,516,787, Cl. 279-1.0SG.
Wyatt, Kenneth L., 4,516,739, Cl. 242-155.00M.
Ateliers de Constructions Electriques de Charleroi (ACEC): *See*—
Dacier, Jacques, 4,517,484, Cl. 310-266.000.
Atlantic Richfield Company: *See*—
Morel, Don L.; Gay, Robert R.; and Turner, Gary B., 4,517,403, Cl. 136-249.000.
Sofranko, John A., 4,517,398, Cl. 585-500.000.
Wakefield, G. Felix; Bender, David L.; and Rea, Samuel N., 4,517,049, Cl. 156-622.000.
Audi NSU Auto Union Aktiengesellschaft: *See*—
Bier, Axel, 4,517,469, Cl. 307-10.0LS.
Automated Industrial Systems: *See*—
Lawrence, Merlin, 4,517,436, Cl. 219-121.0LH.
Automotive Products, plc: *See*—
Nix, Richard; and Compton, David J., 4,516,748, Cl. 248-1.000.
Avery, Joseph J., to Sherburne Corporation. Snow-making nozzle. 4,516,722, Cl. 239-14.000.
Avey, Kenneth F. C., to British Matthews Limited, The. De-palletizer. 4,516,900, Cl. 414-417.000.
Awata, Masashi: *See*—
Sakakibara, Hideo; Awata, Masashi; Satoi, Shuzo; Mutoh, Naoki; Takada, Masaki; and Hayashi, Mitsuo, 4,517,296, Cl. 435-119.000.
Awater, Albert: *See*—
Dahm, Manfred; Weimann, Norbert; Nehen, Ulrich; Muller, Hanns P.; Jabs, Gert; Awater, Albert; and Barnes, James M., 4,517,141, Cl. 264-4.700.
Ayada, Haruki: *See*—
Takezawa, Susumu; Ikebe, Ken'ichi; Ayada, Haruki; Fukui, Tatsuyuki; and Okada, Munenori, 4,516,746, Cl. 244-170.000.
Ayers, Ray R., to Shell Oil Company. Float recovery system. 4,516,517, Cl. 114-51.000.
Azad, Farzin H.: *See*—
Kim, Wontaik; and Azad, Farzin H., 4,516,864, Cl. 374-130.000.
Azuma, Hiroshi: *See*—
Ishikawa, Masayuki; Azuma, Hiroshi; Sugimoto, Akiko; Takahashi, Noriko; and Takashima, Yoshimi, 4,517,189, Cl. 514-259.000.
B. F. Goodrich Company: *See*—
Ely, Duain N.; and Macarchenia, Joseph H., 4,516,745, Cl. 244-134.00A.
Baba, Takeshi; and Matsuoka, Kazuhiko, to Canon Kabushiki Kaisha. Colored image reading apparatus. 4,517,589, Cl. 358-75.000.
Babbitt, Brett A.; and Le, Tri C., to Joy Manufacturing Company. Mechanically preloaded packing assembly. 4,516,752, Cl. 251-214.000.
Babbitt, Richard W.: *See*—
Stern, Richard A.; and Babbitt, Richard W., 4,517,536, Cl. 333-254.000.
Babcock & Wilcox Company, The: *See*—
Whaley, Hubert L., 4,516,520, Cl. 116-217.000.
Babington, Robert S., to Owens-Illinois. Flow control module and method for liquid fuel burners and liquid atomizers. 4,516,928, Cl. 431-12.000.
Babler, Fridolin; and Weissmuller, Adolf, to Ciba-Geigy Corporation. Stoving lacquers containing graphite. 4,517,320, Cl. 523-215.000.
Backus, James: *See*—
Winckler, Elmer, 4,516,637, Cl. 166-377.000.
Bademian, Leon, to Isonet Corporation. Overlapping electrode structure for multi-channel acousto-optic devices. 4,516,838, Cl. 350-358.000.
Baer, Ted A., to Zoecon Corporation. Substituted amino acid process. 4,517,130, Cl. 260-465.00E.
Bailey, Denis M.: *See*—
Wentland, Mark P.; and Bailey, Denis M., 4,517,191, Cl. 514-300.000.
Bailey, John C., to Union Carbide Corporation. Nonaqueous cell employing an anode having a boron-containing surface film. 4,516,317, Cl. 29-623.500.
Balaban, Alvin R.; and Steckler, Steven A., to RCA Corporation. Digital television receiver with analog-to-digital converter having time multiplexed gain. 4,517,586, Cl. 358-13.000.
Balcon Industries: *See*—
Ballo, James A., 4,516,489, Cl. 100-98.00R.
Baldi, Livio; and Maggis, Aldo, to SGS-ATES Componenti Elettronici S.p.A. Metallization process of a wafer back. 4,517,226, Cl. 427-90.000.
Ball, Kevin D.; and Davies, Peter, to Coated Electrodes Limited. Apparatus for sealing electrodes in electric arc furnaces. 4,517,678, Cl. 373-95.000.
Ball, Randell D. Well site document container. 4,516,719, Cl. 232-1.00D.
Ballo, James A., to Balcon Industries. Apparatus for crushing articles. 4,516,489, Cl. 100-98.00R.
Banba, Kiyotaka: *See*—
Matsunaga, Fujihisa; Nishimura, Tadahiko; Miyake, Etsuo; and Banba, Kiyotaka, 4,517,387, Cl. 568-728.000.
Bando Chemical Industries, Ltd.: *See*—
Wada, Noriaki, 4,517,332, Cl. 524-506.000.
Bandura, Vitaly, to USM Corporation. Cut-clinch mechanism for variably spaced component leads. 4,516,310, Cl. 29-566.300.
Baniel, Avraham M., to Yissum Research Development Company of the Hebrew University of Jerusalem. Method for producing permeable polymeric membranes. 4,517,142, Cl. 264-22.000.
Banks, Robert L.: *See*—
Kukes, Simon G.; and Banks, Robert L., 4,517,401, Cl. 585-645.000.
Bannai, Akira, to Tokyo Shibaura Denki Kabushiki Kaisha. Interrupt control apparatus for a data processing system. 4,517,643, Cl. 364-200.000.
Banno, Taiichi: *See*—
Galle, Kevin; Orimo, Ryoichi; Sakurada, Masahiko; Banno, Taiichi; and Manabe, Sugio, 4,517,160, Cl. 422-65.000.
Banovic, Peter: *See*—
Burton, Charles A.; and Banovic, Peter, 4,516,699, Cl. 222-591.000.
Barabas, Eugene S., to GAF Corporation. Rust removal process using removable coatings of maleic acid copolymers. 4,517,023, Cl. 134-4.000.
Baran, Michael S.; Besasie, Joseph C.; Warren, Wayne L.; and Montgomery, Allen W., to Koss Corporation. Portable stereophone. 4,517,418, Cl. 179-156.00R.
Barber, James J., to Halcon SD Group, Inc., The. Process for the electrochemical synthesis of ethylene glycol from formaldehyde. 4,517,062, Cl. 204-77.000.
Barege, Jacqueline. Dispenser for continuous, severable strips. 4,516,711, Cl. 225-20.000.
Barker, Dale E., to Procter & Gamble Company, The. Easy open/reclosable container with pouring lip and hold-open feature. 4,516,689, Cl. 220-335.000.
Barner, Gregory P.; and Hancock, Drew S., to Siemens-Allis, Inc. Concealed-fastener panelboard front and clamping latches. 4,517,623, Cl. 361-358.000.
Barnes, James M.: *See*—
Dahm, Manfred; Weimann, Norbert; Nehen, Ulrich; Muller, Hanns P.; Jabs, Gert; Awater, Albert; and Barnes, James M., 4,517,141, Cl. 264-4.700.
Barnik, Edward A.: *See*—
Heininger, Ammon N., Jr.; and Barnik, Edward A., 4,516,324, Cl. 30-377.000.
Barre, Claude, to Siemens Aktiengesellschaft. ECL Gate having emitter bias current switched by input signal. 4,517,476, Cl. 307-455.000.
Barringer, Anthony R. Remote detection of hydrocarbon seeps. 4,517,458, Cl. 250-253.000.
Barriquand: *See*—
Barriquand, Robert; Barriquand, Bernard; Durantet, Bernard; and Machabert, Bernard, 4,516,413, Cl. 68-5.00C.
Barriquand, Bernard: *See*—
Barriquand, Robert; Barriquand, Bernard; Durantet, Bernard; and Machabert, Bernard, 4,516,413, Cl. 68-5.00C.
Barriquand, Robert; Barriquand, Bernard; Durantet, Bernard; and Machabert, Bernard, to Barriquand. Machines for the liquid or gaseous treatment of textile material or other fibrous or porous materials. 4,516,413, Cl. 68-5.00C.
Bartesaghi, Angelo. Plane die-cutting machine. 4,516,457, Cl. 83-646.000.
Barth, Gerald D., to Illinois Tool Works Inc. Sheet metal screw. 4,516,893, Cl. 411-184.000.
Barth, Hans: *See*—
Humble, David R.; and Barth, Hans, 4,516,873, Cl. 403-191.000.
Barth, Hubert; Fritschi, Edgar; Ganser, Volker; Hartenstein, Johannes; Herrmann, Manfred; and Satzinger, Gerhard, to Warner-Lambert Company. 2-Pyrrolin-3-carbonitrile derivatives, and pharmaceutical compositions containing them and their anti-inflammatory and ulcer protective activity. 4,517,185, Cl. 514-232.000.
Barthold, Klaus: *See*—
Oppenlaender, Knut; Stork, Karl; and Barthold, Klaus, 4,517,114, Cl. 252-389.00R.
Bartzick, Gunter; Buhne, Gerd; and Naydowski, Reinhard, to Hoesch Werke Aktiengesellschaft. Support and tensioning apparatus for tensioning a strapping band about a package. 4,516,488, Cl. 100-4.000.
BASF Aktiengesellschaft: *See*—
Becker, Rainer; Jahn, Dieter; Keil, Michael; Himmele, Walter; and Wuerzer, Bruno, 4,517,013, Cl. 71-98.000.
Graser, Fritz; Hoffmann, Gerhard; Leyrer, Reinhold J.; Neumann, Peter; and Patsch, Manfred, 4,517,270, Cl. 430-58.000.
Janitschke, Lothar; and Hoffmann, Werner, 4,517,382, Cl. 564-267.000.
Lynch, John; Naarmann, Herbert; Schulz, Gunther; Vyvial, Rudolf; Wallbillich, Gunter; and Zurger, Manfred, 4,517,277, Cl. 430-281.000.
Oppenlaender, Knut; Stork, Karl; and Barthold, Klaus, 4,517,114, Cl. 252-389.00R.
Schlecker, Rainer; Friedrich, Ludwig; and Lenke, Dieter, 4,517,196, Cl. 514-371.000.
Schupp, Eberhard; and Kempter, Fritz E., 4,517,343, Cl. 525-488.000.

Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Knibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 568-885.000.

BASF Wyandotte Corporation: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,517,383, Cl. 564-443.000.

Basic, John N., Sr. Incinerator with two reburn stages and, optionally, heat recovery. 4,516,510, Cl. 110-346.000.

Basil, Dan. Lift rail window structure. 4,516,355, Cl. 49-460.000.

Bauer, Alexander: *See*—
Leistner, Gerhard; Muller, Gerhard; Sell, Gunther; and Bauer, Alexander, 4,517,093, Cl. 210-629.000.

Baugh, Benton F. Torus type connector. 4,516,795, Cl. 285-315.000.

Baugh, Bill T.: *See*—
Outlaw, Ronald A.; and Baugh, Bill T., 4,516,435, Cl. 73-863.110.

Baughman, Ray H.: *See*—
Ivory, Dawn M.; Miller, Granville G.; Chance, Ronald R.; and Baughman, Ray H., 4,517,116, Cl. 252-500.000.

Baumann, Hans-Peter, to Sandoz Ltd. Polybenzoates as disperse dyeing assistants. 4,516,979, Cl. 8-583.000.

Baumert, Dietrich: *See*—
Skotsch, Carlo; Baumert, Dietrich; Krahmer, Hansjorg; and Arndt, Friedrich, 4,517,367, Cl. 546-276.000.

Baxter, Kern C. A.; and Grm, Heinz-Gert. Pressure exerting device. 4,516,568, Cl. 128-70.000.

Baxter Travenol Laboratories, Inc.: *See*—
Kersten, Jean; and Mathias, Jean M., 4,517,090, Cl. 210-493.200.

Bayer Aktiengesellschaft: *See*—
Dahm, Manfred; Weimann, Norbert; Nehen, Ulrich; Muller, Hanns P.; Jabs, Gert; Awater, Albert; and Barnes, James M., 4,517,141, Cl. 264-4.700.
Kunde, Klaus; and Stohr, Frank-Michael, 4,517,357, Cl. 534-605.000.
Luhmann, Erhard; Hoppe, Lutz; Szablikowski, Klaus; and Lampert, Friedrich-Karl, 4,517,324, Cl. 524-27.000.
Schmidt, Manfred; Rathmann, Dietrich; and Reinking, Klaus, 4,517,328, Cl. 524-370.000.
Thomas, Rudolf; Draber, Wilfried; Schmidt, Robert R.; and Eue, Ludwig, 4,517,011, Cl. 71-92.000.
Zecher, Wilfried; Merten, Rudolf; and Dunwald, Willi, 4,517,353, Cl. 528-45.000.

BBC Brown, Boveri & Company, Limited: *See*—
Furrer, Andreas, 4,517,522, Cl. 330-10.000.
Sittig, Roland, 4,517,582, Cl. 357-38.000.

Beall, Gary W., to Radecca, Inc. Process for treating organics contaminated water. 4,517,094, Cl. 210-664.000.

Bean, Donald E.: *See*—
Lee, Patrick G.; Bean, Donald E.; and Jones, Randy T., 4,517,567, Cl. 343-17.700.

Beard, Frederick H.; Moyer, Maynard M.; and Smith, Clarence, Jr., to Snyder Corporation. Pipe and bar stock transfer and machining system and apparatus. 4,516,307, Cl. 29-564.000.

Beaton, Brian M., to Lord Corporation. Actuator assembly for an industrial manipulator or the like. 4,516,476, Cl. 92-59.000.

Beatty, Gary L. Plastic sheath for fencing. 4,516,756, Cl. 256-1.000.

Beaulieu, Roger D.; Alcorn, William W.; and Matychowiak, David S., to Super-Truss Building Systems, Inc. Superinsulation roof rafter trusses and building system. 4,516,363, Cl. 52-90.000.

Becherer, Johannes; Kuhlein, Klaus; and Kussmaul, Ulrich, to Cassella Aktiengesellschaft. Process for preparing 2-chlorobenzoxazoles. 4,517,370, Cl. 548-217.000.

Bechgaard, Klaus: *See*—
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.

Beck, Christian A.; and Eckert, Alton B., to Pitney Bowes Inc. Anti theft device for a printing machine print wheel assembly. 4,516,494, Cl. 101-93.260.

Becker, Rainer; Jahn, Dieter; Keil, Michael; Himmele, Walter; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Cyclohexane-1,3-dione derivatives and their use for controlling undesirable plant growth. 4,517,013, Cl. 71-98.000.

Beckett, Donald E. Apparatus for formation of packaging material. 4,517,045, Cl. 156-345.000.

Becton, Dickinson and Company: *See*—
Telang, Anil, 4,516,973, Cl. 604-319.000.

Beecham Group Limited: *See*—
Broom, Nigel J. P., 4,517,124, Cl. 260-245.20R.

Beers, Melvin D.: *See*—
White, Mary A.; Beers, Melvin D.; Lucas, Gary M.; Smith, Robert A.; and Swiger, Roger T., 4,517,352, Cl. 528-18.000.

Beharry, Michael, to Hougen Manufacturing, Inc. Annular cutter. 4,516,890, Cl. 408-204.000.

Beidler, David B., to General Battery Corporation. Vent for a storage battery. 4,517,262, Cl. 429-87.000.

Belanger, Andre ; Fauteux, Denis; and Gauthier, Michel, to Hydro-Quebec. Composite and flexible anodes for lithium cells in non-aqueous medium. 4,517,265, Cl. 429-217.000.

Bell, Gilbert C.; and Stanhope, Harry W., to Celanese Corporation. Yarn package for spiralers. 4,516,394, Cl. 57-234.000.

Bell & Howell Company: *See*—
Ricciardi, Mario, 4,516,761, Cl. 270-41.000.

Bell, John E., to Anchor Continental Inc. Adhesive tape fasteners. 4,516,976, Cl. 604-389.000.

Bell, Ted A., to Pretty Products, Inc. Merchandise display rack. 4,516,682, Cl. 211-59.100.

Bellows, James C.: *See*—
Kemper, Christian T.; Osborne, Robert L.; and Bellows, James C., 4,517,468, Cl. 290-52.000.

Beloit Corporation: *See*—
Roerig, Arnold J.; and Schroeder, Robert W., 4,517,056, Cl. 162-344.000.

Benckiser-Knapsack GmbH: *See*—
Crawford, David L., 4,517,208, Cl. 426-332.000.

Bender, David L.: *See*—
Wakefield, G. Felix; Bender, David L.; and Rea, Samuel N., 4,517,049, Cl. 156-622.000.

Bengtsson, Jan: *See*—
Haraldsson, Roland; Bengtsson, Jan; and Friberg, Claes, 4,517,211, Cl. 426-444.000.

Benitez, Willie B., III; and Masten, Billy R., to Texas Instruments Incorporated. Dual peak detector. 4,517,455, Cl. 235-463.000.

Benjamin, William S.: *See*—
Johnson, Robert S.; Fletcher, Paul E.; Benjamin, William S.; and Zaitvay, John I., 4,516,287, Cl. 15-119.00A.

Benko, David A., to Goodyear Tire & Rubber Company, The. Ion beam deposition or etching re rubber-metal adhesion. 4,517,066, Cl. 204-192.00C.

Bennes Marrel: *See*—
Chanal, Roger; and Cotte, Daniel, 4,516,601, Cl. 137-510.000.

Bennett, Ross L.; Price, Robert B.; Springen, Clyde H.; and Kilbourn, Harlan C., to Texas Instruments Incorporated. Hand-held manipulator application module. 4,517,652, Cl. 364-513.000.

Benoit, Richard E.: *See*—
Johnston, Harold; and Benoit, Richard E., 4,516,818, Cl. 339-36.000.

Beran, Anthony V. Clamping structure. 4,516,293, Cl. 24-16.0PB.

Bergen, Gary R., to Emhart Industries, Inc. Latch bolt operating assembly having bolt operating improvements. 4,516,798, Cl. 292-169.130.

Berger, Charles; and Ruth, Kenneth, to Archival Color Technologies. Processing machine for printing. 4,517,267, Cl. 430-3.000.

Berger, Hans S.; Mercurio, Frank; and Reiner, Norbert L., to Coleco Industries, Inc. Child's ride-on toy with reversing drive for rear wheels. 4,516,648, Cl. 180-6.660.

Bergfalk, Bjorn, to Aktiebolaget Bofors. Shear beam load cell with built-in bearing elements. 4,516,646, Cl. 177-211.000.

Berglund, Carl O., to Teledyne Exploration Company. Seismic apparatus. 4,517,664, Cl. 367-163.000.

Bergman, Rolf S.: *See*—
Otto, Lee W.; Ingold, John H.; and Bergman, Rolf S., 4,517,491, Cl. 313-579.000.

Bergwerksverband: *See*—
Romey, Ingo; and Lennartz, Rudiger, 4,517,086, Cl. 210-323.200.

Berkeley Glasslab: *See*—
Snider, Wendall L.; and Wagner, Edward A., 4,516,897, Cl. 414-180.000.

Berlex Laboratories, Inc.: *See*—
Diamond, Julius; and Wohl, Ronald A., 4,517,310, Cl. 514-394.000.

Berman, Oded; Eilam, Zohar; and Itzchak, Zeev B., to Ergoplic Ltd., An Israel Company. Speaking toy employing chordic input. 4,516,950, Cl. 446-297.000.

Bernstein, Benjamin T.; Bock, Thomas J.; Toman, George M.; and Bhatia, Chandrakant, to Union Special Corporation. Modularized Cardan sewing machine. 4,516,512, Cl. 112-165.000.

Bernstein, David H.: *See*—
Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., 4,517,642, Cl. 364-200.000.

Bernt, Erich: *See*—
Scheibe, Peter; Bernt, Erich; and Klose, Sigmar, 4,517,287, Cl. 435-4.000.

Berry, James A.; Sherman, Morton; and Stevenson, John W., to Celotex Corporation, The. Foam slabs in mine tunnel stoppings. 4,516,879, Cl. 405-132.000.

Berte , Marc; Bidard, Louis; and Lechopier, Serge, to Compagnie d'Electronique et de Piezo-Electricite. High-frequency piezoelectric resonator with reinforced electrode connection. 4,517,485, Cl. 310-320.000.

Besasie, Joseph C.: *See*—
Baran, Michael S.; Besasie, Joseph C.; Warren, Wayne L.; and Montgomery, Allen W., 4,517,418, Cl. 179-156.00R.

Bettcher Industries, Inc.: *See*—
Bettcher, Louis A.; and Decker, Richard B., 4,516,323, Cl. 30-276.000.

Bettcher, Louis A.; and Decker, Richard B., to Bettcher Industries, Inc. Rotary hand knife and parts therefor. 4,516,323, Cl. 30-276.000.

Betts, William; and Smith, Wesley H., to Paradyne Corporation. Error vector normalizer. 4,517,680, Cl. 375-75.000.

Beynet, Pierre A.; and von Aschwege, J. Thomas, to Standard Oil Company. Multiterminators for riser pipes. 4,516,881, Cl. 405-195.000.

Bhatia, Chandrakant: *See*—
Bernstein, Benjamin T.; Bock, Thomas J.; Toman, George M.; and Bhatia, Chandrakant, 4,516,512, Cl. 112-165.000.

Bhatti, Mohinder S.; Porzio, Thomas J.; and Nagy, Monte L., to Owens-Corning Fiberglas Corporation. Apparatus for forming glass fibers. 4,516,995, Cl. 65-1.000.

BHS-Bayerische Berg-, Hutten- und Salzwerke Aktiengesellschaft: *See*—
Mosburger, Hans, 4,516,454, Cl. 83-499.000.
Bicker, Uwe: *See*—
Bosies, Elmar; Kampe, Wolfgang; Thiel, Max; Bicker, Uwe; and Boerner, Dietmar, 4,517,183, Cl. 514-183.000.
Bickerdike, Robert L.; and Hughes, Garyth, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Bulk production of alloys by deposition from the vapor phase and apparatus therefor. 4,517,027, Cl. 148-6.300.
Bidard, Louis: *See*—
Berte , Marc; Bidard, Louis; and Lechopier, Serge, 4,517,485, Cl. 310-320.000.
Bier, Axel, to Audi NSU Auto Union Aktiengesellschaft. Circuit for a current consuming device in a motor vehicle. 4,517,469, Cl. 307-10.0LS.
Bingham, Grady A., to Thermal Concepts, Inc. Earth-type heat exchanger for heat pump system. 4,516,629, Cl. 165-45.000.
Bird, Clive W.; Butler, Helene I.; Caton, Michael P. L.; Coffee, Edward C. J.; Darnbrough, Geoffrey; and Hart, Terance W., to May & Baker Limited. Prostaglandin analogues. 4,517,202, Cl. 514-530.000.
Birkmeyer, William J.; Gray, Ralph C.; Dowbenko, Rostyslaw; Kapp, David C.; VanBuskirk, Ellor J.; and Maska, Rudolf, to PPG Industries, Inc. Acrylated alkyd and polyester resins. 4,517,322, Cl. 523-501.000.
Birks, Colin: *See*—
Ridout, Paul S.; and Birks, Colin, 4,517,585, Cl. 357-81.000.
Bischoff, Peter G., to Memorex Corporation. Thin film magnetic recording transducer having embedded pole piece design. 4,517,616, Cl. 360-126.000.
Bishop, Ernest C.: *See*—
Murphy, Gordon D.; and Bishop, Ernest C., 4,517,206, Cl. 426-115.000.
Black, Charles E., III; and Halstead, Raymond T., to Indak Manufacturing Corp. Electrical switch having interlocked blower and air conditioner switch components for vehicles. 4,517,422, Cl. 200-50.00C.
Black & Decker Inc.: *See*—
Heininger, Ammon N., Jr.; and Barnik, Edward A., 4,516,324, Cl. 30-377.000.
Krasznai, Charles Z.; and Norwood, Richard L., 4,517,452, Cl. 219-413.000.
Blake, James A.: *See*—
Parker, John C.; and Blake, James A., 4,516,851, Cl. 356-28.000.
Blakely, Linda L.; Goodman, John C.; and Walker, David B., to Polaroid Corporation. Security control system and method for identification card cameras. 4,516,845, Cl. 354-412.000.
Blaskie, Marcus W.: *See*—
Pesa, Frederick A.; Blaskie, Marcus W.; and Fox, Joseph R., 4,517,400, Cl. 585-638.000.
Blegen, James R., to Ashland Oil, Inc. Vaporous amine catalyst spray method of applying a film to a substrate. 4,517,222, Cl. 427-30.000.
Blei, Peter: *See*—
Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 568-885.000.
Bloch, Ricardo; McCrary, Thomas J., Jr.; and Brownawell, Darrell W., to Exxon Research & Engineering Co. Ethylene copolymer viscosity index improver-dispersant additive useful in oil compositions. 4,517,104, Cl. 252-51.50A.
Block, Richard M. Universal child's toilet trainer. 4,516,279, Cl. 4-235.000.
Blue Circle Industries PLC: *See*—
Inculet, Ion I.; Norberg, Anna K. E.; and Hepher, Nicholas M., 4,517,078, Cl. 209-127.300.
Boccaletti, Pietro, to AMECA S.r.l. Machine for replacing railway switches and tracks. 4,516,503, Cl. 104-3.000.
Bock, Susan C.; and Lawn, Richard M., to Genentech, Inc. Human antithrombin III. 4,517,294, Cl. 435-70.000.
Bock, Thomas J.: *See*—
Bernstein, Benjamin T.; Bock, Thomas J.; Toman, George M.; and Bhatia, Chandrakant, 4,516,512, Cl. 112-165.000.
Bocker, Jurgen: *See*—
Klein, Klaus-Walter; Bocker, Jurgen; Glotz, Gerhard; and Gersbach, Klaus, 4,516,502, Cl. 102-523.000.
Boeckmann, Eduard F. B., to GTE Communication Systems Corp. Hookswitch bounce resistant telephone hold-mute circuit. 4,517,414, Cl. 179-81.00R.
Boehringer Mannheim GmbH: *See*—
Bosies, Elmar; Kampe, Wolfgang; Thiel, Max; Bicker, Uwe; and Boerner, Dietmar, 4,517,183, Cl. 514-183.000.
Scheibe, Peter; Bernt, Erich; and Klose, Sigmar, 4,517,287, Cl. 435-4.000.
Boeing Company, The: *See*—
Ferrell, Philip J.; Stern, Alan D.; and McFarland, Melvin D., 4,517,639, Cl. 364-186.000.
Hugh, Steven C., 4,517,252, Cl. 428-553.000.
Loch, David M.; and Henkes, Dale D., 4,517,059, Cl. 204-14.100.
Boerner, Dietmar: *See*—
Bosies, Elmar; Kampe, Wolfgang; Thiel, Max; Bicker, Uwe; and Boerner, Dietmar, 4,517,183, Cl. 514-183.000.
Boginsky, Vladimir P.: *See*—
Kostylev, Alexandr D.; Syryamin, Jury N.; Smolyanitsky, Boris N.; Boginsky, Vladimir P.; and Terskov, Alexei D., 4,516,662, Cl. 173-53.000.
Bogner, Martin: *See*—
Scheck, Georg; and Bogner, Martin, 4,516,792, Cl. 280-625.000.
Bohaychick, John: *See*—
Laemmle, Joseph T.; and Bohaychick, John, 4,517,105, Cl. 252-56.00R.
Bohg, Armin; Matthaei, Horst D.; and Hartmann, Kurt, to International Business Machines Corporation. Electromagnetic rotary actuator with rocking movement, in particular for impact printers. 4,517,538, Cl. 335-272.000.
Bohlen, Peter: *See*—
Ling, Nicholas C.; Esch, Frederick S.; Bohlen, Peter; Brazeau, Paul E., Jr.; and Guillemin, Roger C. L., 4,517,181, Cl. 514-12.000.
Boll, Hans-Joachim, to J. Wagner GmbH. Electrical feed and control circuit for the pump piston of a spray gun. 4,517,620, Cl. 361-154.000.
Boll & Kirch Filterbau GmbH: *See*—
Romey, Ingo; and Lennartz, Rudiger, 4,517,086, Cl. 210-323.200.
Bolte, Steven B.: *See*—
Gruber, Robert J.; Knapp, John F.; and Bolte, Steven B., 4,517,268, Cl. 430-39.000.
Borg-Warner Corporation: *See*—
Laster, Walter R., 4,516,964, Cl. 474-245.000.
Mott, Philip J., 4,516,963, Cl. 474-245.000.
Mott, Philip J., 4,516,965, Cl. 474-245.000.
Roberts, Richard W., 4,516,919, Cl. 418-23.000.
Borsuk, Leslie M.; and Corrales, Patrick G., to International Telephone & Telegraph Corporation. Fiber optic contact retention assembly. 4,516,829, Cl. 350-96.200.
Bosies, Elmar; Kampe, Wolfgang; Thiel, Max; Bicker, Uwe; and Boerner, Dietmar, to Boehringer Mannheim GmbH. N-Substituted aziridine-2-carboxylic acid derivatives. 4,517,183, Cl. 514-183.000.
Bosker, Hans. System for denture support using a transmandibular implant. 4,516,937, Cl. 433-173.000.
Bosman, Jakob, to U.S. Philips Corporation. Air blowing device. 4,516,483, Cl. 98-40.140.
Bostrom, Karl J. Gear shifting device. 4,516,669, Cl. 192-3.580.
Bott, John A. Vehicle article carrying device. 4,516,709, Cl. 224-315.000.
Bott, John A. Article carrier for automotive vehicles. 4,516,710, Cl. 224-324.000.
Bouiller, Jean G.; Delonge, Jean-Claude L.; Rigo, Marcel L. A.; and Zietek, Didier G., to S.N.E.C.M.A. Retractable damping device for blades of a turbojet. 4,516,910, Cl. 416-190.000.
Bourgeois, Serge; Carle, Jean-Franqois; Lochon, Henri; and Trotin, Jean-Pierre, to International Business Machines Corporation. Electron gun equipment for vacuum deposition. 4,516,525, Cl. 118-688.000.
Bourgery, Guy R.: *See*—
Ancher, Jean-Francois R.; Bourgery, Guy R.; Dostert, Philippe L.; Douzon, Colette A.; Guerret, Patrick G.; Lacour, Alain P.; and Langlois, Michel, 4,517,197, Cl. 514-376.000.
Boyer, Robert; and Duval, Claude, to Commissariat a l'Energie Atomique. Device for measuring an ion current produced by an ion beam. 4,517,462, Cl. 250-286.000.
Boyette, Bobby R. Tool holder with work release mechanism. 4,516,449, Cl. 83-140.000.
Boyle, Joseph P.; and Gilbert, John B., to Exxon Research and Engineering Co. Reactivation of iridium-containing catalysts. 4,517,076, Cl. 208-140.000.
BP Chemicals Limited: *See*—
Eve, Paul L.; and Speakman, John G., 4,517,345, Cl. 526-105.000.
Braathen, Thor F. Terrain-travelling motor vehicle. 4,516,649, Cl. 180-9.100.
Brace, Neal O., to Ciba-Geigy Corporation. Perfluoroalkyl alkylene vinyl sulfoxides and sulfones. 4,517,384, Cl. 568-27.000.
Bracke, James W.; and Thacker, Kipling, to Diagnostic, Inc. Hyaluronic acid from bacterial culture. 4,517,295, Cl. 435-101.000.
Brackner, Raymond A. Apparatus and method for handling solids in liquid. 4,517,099, Cl. 210-741.000.
Bradford, Herbert G. Spot light for handbag and like receptacles. 4,517,627, Cl. 362-156.000.
Brand, Derek A.; Brand, Derek R.; and Brand, Kenneth J., to Derek and Derek. Push-down actuated toy. 4,516,952, Cl. 446-427.000.
Brand, Derek R.: *See*—
Brand, Derek A.; Brand, Derek R.; and Brand, Kenneth J., 4,516,952, Cl. 446-427.000.
Brand, Kenneth J.: *See*—
Brand, Derek A.; Brand, Derek R.; and Brand, Kenneth J., 4,516,952, Cl. 446-427.000.
Brandenstein, Manfred; Haas, Roland; Edelmann, Ludwig; and Hans, Rudiger, to SKF Kugellagerfabriken GmbH. Tension roller for drive belts. 4,516,962, Cl. 474-112.000.
Brandyberry, Dennis R.: *See*—
Palmer, Kenneth J.; Brandyberry, Dennis R.; and Rye, Grover W., 4,516,395, Cl. 57-237.000.
Braun, Oskar J.; and Hubler, Lawrence C., to Xerox Corporation. High speed duplicator with sorter/stapling apparatus and stapler positioning control. 4,516,714, Cl. 227-78.000.
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Gasiot, Jean; Braunlich, Peter F.; and Fillard, Jean-Pierre, 4,517,463, Cl. 250-327.200.
Braverman, Samuel. Process for the selective preparation of para-bromophenol and its derivatives. 4,517,388, Cl. 568-779.000.
Brazeau, Paul E., Jr.: *See*—
Ling, Nicholas C.; Esch, Frederick S.; Bohlen, Peter; Brazeau, Paul E., Jr.; and Guillemin, Roger C. L., 4,517,181, Cl. 514-12.000.

Brear, Frederick, to Massey-Ferguson-Perkins Limited. Internal combustion engine. 4,516,549, Cl. 123-276.000.

Breining, Frank E., to Airmaster Fan Company. Modular switch housing for an electric motor. 4,517,481, Cl. 310-71.000.

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DeVale, Donald P.; Brejcha, Robert J.; and Van Naarden, Robert W., 4,516,781, Cl. 273-373.000.

Brems, John H.; and Vaphiadis, John L., to Lamb Technicon Corp. Cross-over track structure for wheeled pallets. 4,516,504, Cl. 104-130.000.

Brennan, Robert J.; and Meighen, Terrence, to Stewart Stamping Corporation. Modular connector for terminating EMI/RFI shielded cordage. 4,516,825, Cl. 339-143.00R.

Brennan, Thomas M.; and Hendrick, Michael E., to Pfizer Inc. Branched amides of L-aspartyl-D-amino acid dipeptides. 4,517,379, Cl. 564-193.000.

Bretl, Wayne E., to Zenith Electronics Corporation. Integrated crystal VCO. 4,517,533, Cl. 331-116.00R.

Breville Holdings Pty. Limited: *See*—
Yip, Shu W., 4,516,926, Cl. 425-464.000.

Brewer, John H.; and Cress, Hobart A., to Fluor Subsea Services, Inc. Method and apparatus for conversion of semi-submersible platform to tension leg platform for conducting offshore well operations. 4,516,882, Cl. 405-224.000.

Bridgestone Tire Co., Ltd.: *See*—
Takasu, Ryo; and Nakao, Makoto, 4,517,146, Cl. 264-40.600.
Takeshita, Masaru; Tokunaga, Toshio; and Ogawa, Yuichiro, 4,516,451, Cl. 83-171.000.

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Milford, Edgar L.; Carpenter, Charles B.; and Paradysz, Jean M., 4,517,289, Cl. 435-7.000.

Briney, Gary C.; and Fuerniss, Stephen J., to Du Pont de Nemours, E. I., and Company. Development process for aqueous developable photopolymerizable elements. 4,517,281, Cl. 430-322.000.

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Crenshaw, Ronnie R.; and Algieri, Aldo A., 4,517,366, Cl. 546-231.000.

British Matthews Limited, The: *See*—
Avey, Kenneth F. C., 4,516,900, Cl. 414-417.000.

British Nuclear Fuels Limited: *See*—
Alderton, Geoffrey W.; and Davidge, Peter C., 4,516,966, Cl. 494-1.000.

Broadbent, Eliot K., to Signetics Corporation. Method for manufacturing an electrical interconnection by selective tungsten deposition. 4,517,225, Cl. 427-89.000.

Brode, George L.: *See*—
Gardner, Hugh C.; Michno, Michael J., Jr.; and Brode, George L., 4,517,321, Cl. 523-400.000.

Brokke, Mervin E.: *See*—
Palios, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,517,012, Cl. 71-94.000.

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Brookes, David L.; Weatherly, John D.; and Dillicar, Colin R., to Development Finance Corporation of New Zealand. Ball identification for a table ball game. 4,516,770, Cl. 273-11.00R.

Broom, Nigel J. P., to Beecham Group Limited. Process for preparing penem derivatives. 4,517,124, Cl. 260-245.20R.

Brooshooft, Lawrence H.: *See*—
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Brother Kogyo Kabushiki Kaisha: *See*—
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Kako, Mitumasa; and Ishigami, Michifumi, 4,516,508, Cl. 108-7.000.

Brotherton, Mary M.: *See*—
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Brown, Boveri & Cie AG: *See*—
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Brown Boveri Reaktor GmbH: *See*—
Pieper, Kurt; and Scharpenberg, Rainer, 4,517,152, Cl. 376-252.000.

Brown, Christopher R.; Corrie, John D.; and Wilson, William G. J., to Westinghouse Brake & Signal Co. Computer-based interlocking system. 4,517,673, Cl. 371-36.000.

Brown, James M., to AT&T Bell Laboratories. Magnetic differential current sensor. 4,517,513, Cl. 324-117.00R.

Brown, Sammy K.: *See*—
Solimeno, Duane; Koeppen, Peter L.; Rogers, Gerald; and Brown, Sammy K., 4,517,656, Cl. 364-900.000.

Brown & Williamson Tobacco Corporation: *See*—
Heaney, Richard; and Naslund, Erik I., 4,517,046, Cl. 156-500.000.

Brownawell, Darrell W.: *See*—
Bloch, Ricardo; McCrary, Thomas J., Jr.; and Brownawell, Darrell W., 4,517,104, Cl. 252-51.50A.

Brownell, Dean B.: *See*—
Harland, Gary D.; and Brownell, Dean B., 4,517,144, Cl. 264-28.000.

Brubaker, John R., to Eaton Corporation. SME overcurrent protective apparatus having ambient temperature compensation. 4,517,543, Cl. 337-140.000.

Brunner, Alfred, to Sulzer Brothers Limited. Means for suspending pipework. 4,516,750, Cl. 248-58.000.

Brusis, Otto; Maiter, Sigurd; and Haufe, Paul. Circuit arrangement for the production of a quasi-electrostatic field. 4,517,621, Cl. 361-231.000.

Bryant, John H.; and Schultz, Steven M., to Bryant, John H. True ground speed sensor. 4,517,566, Cl. 343-8.000.

Buch, James R.: *See*—
Agron, Michael H.; Buch, James R.; and LaVoie, Robert E., 4,517,557, Cl. 340-540.000.

Buchan, Ian A., to Smith and Nephew Associated Companies p.l.c. Medical device, its preparation and use. 4,516,571, Cl. 128-132.00R.

Bucher-Guyer AG: *See*—
Hartmann, Eduard, 4,516,490, Cl. 100-107.000.

Buck, Rainer; Kuttner, Thomas; Piwonka, Fridolin; and Wessel, Wolf, to Robert Bosch GmbH. Electronic control device for a fuel metering system of an internal combustion engine with self-ignition. 4,516,550, Cl. 123-357.000.

Buckland, Bruce E., to United States of America, Army. Adjustable earcup retention harness. 4,516,274, Cl. 2-209.000.

Buckner, Leonard; Foil, William A., Sr.; and Pesho, Stephen W., to Euclid Spiral Paper Tube Corp. Portable apparatus for filling and closing containers. 4,516,380, Cl. 53-282.000.

Budd Company, The: *See*—
Dean, Walter C., II, 4,516,507, Cl. 105-199.00A.

Buder, Wolfgang: *See*—
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Bujadoux, Karel, to Societe Chimique des Charbonnages S.A. Activator comprising a dialkylaluminum monofluoride for the polymerization of ethylene. 4,517,346, Cl. 526-153.000.

Bulso, Joseph D., Jr.; Doyle, Stephen D.; and McClung, James A., to Redicon Corporation. Shell tooling. 4,516,420, Cl. 72-329.000.

Burd, David E. Pod lifting adaptor. 4,516,801, Cl. 294-81.500.

Burford, Henry H. T., Jr.: *See*—
Provisor, Zvi; and Burford, Henry H. T., Jr., 4,517,638, Cl. 364-146.000.

Burget, Paul; and Zortea, Michel, to Saint-Gobain Vitrage. Apparatus for producing molten glass. 4,517,000, Cl. 65-178.000.

Burke Company, The: *See*—
Turner, Frank E., 4,516,875, Cl. 404-50.000.

Burke, Timothy M.; and Noble, Scott W., to Motorola, Inc. Selective call, paging and priority signalling system. 4,517,561, Cl. 340-825.070.

Burkhart, William H. Cooking apparatus and method. 4,516,486, Cl. 99-388.000.

Burlington Industries, Inc.: *See*—
Rowland, Nelson; and Getto, Robert D., 4,516,677, Cl. 206-394.000.

Burnside, Donald L. Helicopter dolly. 4,516,744, Cl. 244-17.170.

Burr; Bruce H., to Hughes Tool Company-USA. Earth boring bit with pressure compensating rigid face seal. 4,516,641, Cl. 175-228.000.

Burroughs Corporation: *See*—
Chamberlain, John T., 4,517,659, Cl. 364-900.000.
Peterson, LuVerne R., 4,517,662, Cl. 365-44.000.

Burry, Daniel C.: *See*—
Coy, Charles H., 4,517,427, Cl. 219-10.510.

Burson, Richard L., to Dow Chemical Company, The. 2,3-Dichloro-5-iodopyridine and methods of making and using the same. 4,517,368, Cl. 546-303.000.

Burton, Charles A.; and Banovic, Peter, to Yellowstone Ltd. Automatic ladling apparatus. 4,516,699, Cl. 222-591.000.

Busacca, Giuseppe, to Consito SpA. Two-stage chlorination process for the production of solid bleaching powder with a high active chlorine content. 4,517,166, Cl. 423-474.000.

Buss, Waldeen C., to Chevron Research Company. Composition and a method for its use in dehydrocyclization of alkanes. 4,517,306, Cl. 502-74.000.

Butel, Jean. Article comprising and method for fabricating a hip prosthesis having a flexible multi-element femoral rod. 4,516,277, Cl. 3-1.913.

Butler, Helene I.: *See*—
Bird, Clive W.; Butler, Helene I.; Caton, Michael P. L.; Coffee, Edward C. J.; Darnbrough, Geoffrey; and Hart, Terance W., 4,517,202, Cl. 514-530.000.

Buzzi, Enrico. Household lighter. 4,516,933, Cl. 431-255.000.

Byerley, John J.; and Enns, Kurt. Discrete particulate bipolar reactor. 4,517,067, Cl. 204-255.000.

Byers, Ross E.: *See*—
Cummins, James N.; Aldwinckle, Herb S.; and Byers, Ross E., 4,516,353, Cl. 47-58.000.

Byrum, Bernard W., Jr.; and Ernsthausen, Roger F , to Owens-Illinois, Inc. Selective control of discharge position in gas discharge display/memory device. 4,517,492, Cl. 313-587.000.

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Hill, Ronald C.; Stein, Richard M.; Bzibziak, Raymond J.; and Goodwill, Robert, 4,516,448, Cl. 83-137.000.

C-COR Electronics, Inc.: *See*—
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C. Reichert Optische Werke: *See*—
Kappl, Gerhard; Kranner, Helmut; and Lihl, Reinhard, 4,516,459, Cl. 83-713.000.

Cabela's Inc.: *See*—
Highby, Dennis N., 4,516,351, Cl. 43-23.000.

Cabinet Brot: *See*—
Chaudot, Gerard, 4,516,932, Cl. 431-202.000.

Calandra, Frank, Jr., to Jennmar Corporation. Method and apparatus for combining resin bonding and mechanical anchoring of a bolt in a rock formation. 4,516,885, Cl. 405-261.000.

Calcagno, Vincent J., Jr., to United States of America, Army. Electronic depth gage. 4,516,326, Cl. 33-169.00B.
Caldwell, Brian E.: *See—*
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Sinha, Kamal R.; and Caldwell, Brian E., 4,517,243, Cl. 428-336.000.
Calhoun, Bernard: *See—*
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Campbell, Jules D., Jr., to Motorola, Inc. Digital to analog converter circuit. 4,517,551, Cl. 340-347.0DA.
Campbell, Sterrett F., to AMF Incorporated. Method of dispensing dough. 4,517,212, Cl. 426-496.000.
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Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Duchesne, Gonzague L.; and Perrault, Guy, 4,517,035, Cl. 149-19.920.
Preston, John M.; Ward, Thomas V.; and Morrow, William H., 4,516,857, Cl. 356-418.000.
Canalizo, Carlos R., to Otis Engineering Corporation. Well pumping apparatus and method. 4,516,917, Cl. 417-390.000.
Canon Kabushiki Kaisha: *See—*
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Pushimoto, Hideo; Toyomura, Shigeru; Nishimuro, Yoshiaki; Asakura, Osamu; and Rachi, Masahiro, 4,517,660, Cl. 364-708.000.
Hirooka, Masaaki; Kubo, Keiji; and Yoshihara, Toshiyuki, 4,517,271, Cl. 430-94.000.
Inoue, Sukejiro; Hasegawa, Tetsuo; and Nishikawa, Yoshihiro, 4,517,273, Cl. 430-111.000.
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Suzuki, Ryoichi; Matsumoto, Seiichi; Amikura, Takashi; Tsunekawa, Tokuichi; and Uchiyama, Takashi, 4,516,835, Cl. 350-336.000.
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Yokomizo, Yoshikazu, 4,517,605, Cl. 358-280.000.
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.
Cantenot, Laurence. Devices for extracting solid materials in bulk in the finely divided state, from the bottom of a silo. 4,516,898, Cl. 414-309.000.
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Caramaschi, Vittorio; and Castelli, Pier Luigi, to Costruzioni Aeronautiche Giovanni Agusta S.p.A. Helicopter Rotor. 4,516,909, Cl. 416-134.00A.
Caray, Andre , to Valeo. Progressive engagement friction disc. 4,516,672, Cl. 192-107.00C.
Carden, Lloyd E., to Aluminum Metals, Inc. Awning stringer. 4,516,362, Cl. 52-75.000.
Carey, Desmond F., to Allied Corporation. Quartz rate sensor. 4,516,427, Cl. 73-505.000.
Carle, Jean-Franqois: *See—*
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Carley, John J.: *See—*
Williams, Daniel E.; Carley, John J.; and Eaton, Paul S., 4,517,410, Cl. 179-6.040.
Carlin Foods Corporation: *See—*
Levine, Lawrence W.; and Mullins, Carolyn C., 4,517,203, Cl. 426-19.000.
Carlquist, John W.: *See—*
Van Valkenburg, George; and Carlquist, John W., 4,517,598, Cl. 358-142.000.
Carlson, Timothy L.: *See—*
Ward, John W.; and Carlson, Timothy L., 4,517,073, Cl. 208-111.000.
Carmean, Wesley F., to IGT. Video processing architecture. 4,517,654, Cl. 364-521.000.
Carpenter, Charles B.: *See—*
Milford, Edgar L.; Carpenter, Charles B.; and Paradyaz, Jean M., 4,517,289, Cl. 435-7.000.
Carr, Dennis D.: *See—*
Miller, Lee E.; Carr, Dennis D.; and Smith, Donald L., 4,517,264, Cl. 429-163.000.
Carre, Jean-Jacques, to Societe Anonyme D.B.A. Dual-circuit brake corrector under deceleration control. 4,516,810, Cl. 303-24.00F.
Carter, Phyllis J.: *See—*
Kemp, Gail W., 4,516,921, Cl. 418-141.000.
Cascini, Michael R., to Rockwell International Corporation. Contrast enhanced liquid crystal display. 4,516,834, Cl. 350-335.000.
Casner, Kenneth H., to Casner, Kenneth H. Method and apparatus for private branch exchange billing. 4,517,411, Cl. 179-7.00R.
Caspari, Fred W., to Magnavox Consumer Electronics Company. Microprocessor controlled system for decoding serial data into parallel data for execution. 4,517,683, Cl. 375-117.000.
Cassat, Robert, to Rhone-Poulenc Specialites Chimiques. Forming of thick-layer, hybrid electronic printed circuits. 4,517,227, Cl. 427-96.000.
Cassell, Douglas A., to Inconix Corporation. Distributed measurement and control system for industrial processes. 4,517,637, Cl. 364-138.000.
Cassella Aktiengesellschaft: *See—*
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Castelli, Pier Luigi: *See—*
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Cate, John M. Catamaran righting accessory. 4,516,518, Cl. 114-61.000.
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Satzler, Ronald L., 4,517,039, Cl. 156-149.000.
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Caton, Michael P. L.: *See—*
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Cattaneo, Leopoldo. Piston ring for endothermic motors having an improved flame damper ring. 4,516,480, Cl. 92-182.000.
Cavanaugh, James E.; Hetherington, Robert D.; and Parmley, Thomas A., to 501 Binks Manufacturing Co. Dual component pumping system. 4,516,725, Cl. 239-127.000.
Cavin, J. N.; and Frees, Kenneth A., to Hoover Universal, Inc. Roll clamp. 4,516,905, Cl. 414-620.000.
Ceaser, Anthony V. Fluoride containing compositions for removal of pollutants from waste waters and methods of utilizing same. 4,517,095, Cl. 210-665.000.
Celanese Corporation: *See—*
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Celotex Corporation, The: *See—*
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Centre National de la Recherche Scientifique (CNRS): *See—*
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Cerrato, Vincent J., to Vending Components, Inc. Keg-pump construction. 4,516,698, Cl. 222-341.000.
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Chamberlain, John T., to Burroughs Corporation. Constant-distance structure polycellular very large scale integrated circuit. 4,517,659, Cl. 364-900.000.
Chan, John K., to Union Carbide Corporation. Process for preparation of cyanohydrins. 4,517,132, Cl. 260-465.00F.
Chanal, Roger; and Cotte, Daniel, to Bennes Marrel. Mining cylinder hydraulic slide valve. 4,516,601, Cl. 137-510.000.
Chance, Ronald R.: *See—*
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Chandler, Noel W. Hydraulic bedknife adjuster for reel-type mowing equipment. 4,516,388, Cl. 56-249.000.
Chang, Chin-An; Chang, Leroy L.; and Esaki, Leo, to United States of America, Army. MBE growth technique for matching superlattices grown on GaAs substrates. 4,517,047, Cl. 156-610.000.
Chang, Leroy L.: *See—*
Chang, Chin-An; Chang, Leroy L.; and Esaki, Leo, 4,517,047, Cl. 156-610.000.
Chang, Yan P. Limitless and limited heat sources power plants. 4,516,402, Cl. 60-656.000.
Chao, Chien C.; and Sherman, John D., to Union Carbide Corporation. Separation of arabinose by selective adsorption on zeolitic molecular sieves. 4,516,566, Cl. 127-46.300.
Chaplin, James E. Automatic temperature adjustment apparatus. 4,516,720, Cl. 237-8.00R.
Chapman, Nicholas J. Support assembly and method. 4,516,365, Cl. 52-170.000.
Charland, Edmund G., Jr.: *See—*
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Chaudot, Gerard, to Cabinet Brot. Safety system intended in particular to elminate entrained or condensed liquids, and to limit the heat radiation when flaring or dispersing hydrocarbon gases. 4,516,932, Cl. 431-202.000.
Chaussepied, Jacques E. C., to Societe Nationale Industrielle Aerospatiale. Pressure balancing device which is watertight as concerns rainwater or trickling water, in particular for a transporting container. 4,516,686, Cl. 220-85.00R.

Chazan, David; and Katila, Michael J., to Raychem Corporation. Laminar electrical heaters. 4,517,449, Cl. 219-549.000.

Cheffer, Haroid H., to NCR Corporation. High frequency inverter. 4,517,470, Cl. 307-64.000.

Chemische Werke Huls AG: *See*—
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Chemische Werke Huls Aktiengesellschaft: *See*—
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Cheng, Chia-Chung, to Warner-Lambert Company. 3-(Haloethyl)-4-oxopyrazolo-[5,1-d]-1,2,3,5-tetrazine-8-carboxamide composition. 4,517,182, Cl. 514-413.000.

Chester, Arthur W.; Garwood, William E.; and Schwartz, Albert B., to Mobil Oil Corporation. Process for the production of high viscosity index lubricating oils from olefins. 4,517,399, Cl. 585-533.000.

Chevron Research Company: *See*—
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Chevrot, Claude: *See*—
Fauvarque, Jean-Francois; Jutand, Anny; Chevrot, Claude; Pfluger, Fernando; and Troupel, Michel, 4,517,061, Cl. 204-59.00R.

Chiba, Mitsuyoshi, to Kabushiki Kaisha Toshiba. Refrigeration system for refrigerant heating type air conditioning apparatus. 4,516,408, Cl. 62-238.700.

Chidester, Dale H., to American Cyanamid Company. Solid-state automatic injection control device. 4,517,473, Cl. 307-269.000.

Childers, John S.; and Pastusek, Paul E., to Reed Rock Bit Company. Drill bit having angled nozzles for improved bit and well bore cleaning. 4,516,642, Cl. 175-340.000.

Chiron Corporation: *See*—
Urdea, Mickey S.; and Warner, Brian D., 4,517,338, Cl. 525-54.110.

Chiron, Daniel M.: *See*—
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Chmela, Andrew, to Ameco Corporation. Gas welding electrode for a small bore. 4,517,433, Cl. 219-75.000.

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Chollet, Christian; and David, Jean, to Electricite de France Service National. Device for measuring the speed of the fluid in the annular space of a steam generator. 4,516,425, Cl. 73-198.000.

Chonshi, Masahiro; and Yahiro, Tetsuji, to Mazda Motor Corporation. V-Type overhead-camshaft engine. 4,516,546, Cl. 123-195.00A.

Chow, Kwong-Wai; Lau, Alfred T. Y.; Chow, Ming-Ngar; and Lee, James S. W., to Lee, James S. Toy vehicle. 4,516,954, Cl. 446-461.000.

Chow, Ming-Ngar: *See*—
Chow, Kwong-Wai; Lau, Alfred T. Y.; Chow, Ming-Ngar; and Lee, James S. W., 4,516,954, Cl. 446-461.000.

Chowdhury, Mofazzal H.: *See*—
Schultz, Per-Erik; Chowdhury, Mofazzal H.; and Neff, Clayton B., 4,516,592, Cl. 134-169.00C.

Choy, Edmund M., to Westvaco Corporation. Internal sizing with black liquid. 4,517,052, Cl. 162-11.000.

Christensen, Charles R.: *See*—
Sweeney, Donald W.; Gallagher, Neal C.; and Christensen, Charles R., 4,516,743, Cl. 244-3.130.

Christine, William C.; and Trillich, Charles H., to Trinity Foundation. Pierce turn tap. 4,516,691, Cl. 222-83.500.

Chromium Corporation: *See*—
Miller, John E.; and Fortino, Dennis J., 4,516,785, Cl. 277-188.00A.

Chrysler Corporation: *See*—
Fizyta, Wojciech L.; and Kaumeheiwa, Algen K., 4,516,288, Cl. 15-250.040.

Chugai Seiyaku Kabushiki Kaisha: *See*—
Takayama, Hiroaki; Yamada, Sachiko; Nakayama, Keiko; and Suda, Tatsuo, 4,517,125, Cl. 260-397.200.

Chulada, Edmund C.; and Nelson, David A., to Ingersoll-Rand Company. Field replaceable screw conveyor inserts. 4,516,302, Cl. 29-156.80R.

Churchland, Mark T., to MacMillan Bloedel Limited. Method for pressing a composite assembly. 4,517,148, Cl. 264-112.000.

Chyz, George W.; and McGregor, David J., to General Motors Corporation. Tripot joint with spider retainer. 4,516,957, Cl. 464-111.000.

Ciba-Geigy AG: *See*—
Leppard, David G.; and Rody, Jean, 4,517,283, Cl. 430-512.000.

Ciba-Geigy Corporation: *See*—
Babler, Fridolin; and Weissmuller, Adolf, 4,517,320, Cl. 523-215.000.
Brace, Neal O., 4,517,384, Cl. 568-27.000.
Habicht, Ernst; and Zbinden, Paul, 4,517,184, Cl. 514-212.000.
Kunz, Walter; and Eckhardt, Wolfgang, 4,517,194, Cl. 514-184.000.
Ramanathan, Visvanathan, 4,517,358, Cl. 534-608.000.

Cichoski, Richard: *See*—
Kaltz, Milton C.; Alexander, Michael P.; and Cichoski, Richard, 4,516,803, Cl. 296-107.000.

Cincinnati Milacron Inc.: *See*—
Schaeffer, Andrew P., 4,516,461, Cl. 83-881.000.

Cirjak, Larry M., to Standard Oil Company, The. Photochemical reactor and method for carrying out photochemical reactions therein. 4,517,063, Cl. 204-157.10R.

Claasen, Theodoor A. C. M.; Stienstra, Albert J.; and van Roermund, Arthur H. M., to U.S. Philips Corporation. Multiplier circuit for multiplying an information signal by a periodic signal. 4,517,655, Cl. 364-703.000.

Clancy, Gerald F.: *See*—
Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., 4,517,642, Cl. 364-200.000.

Clark, Donald G., to AMP Incorporated. Apparatus for assembling an electrical connector to a cable. 4,516,309, Cl. 29-564.400.

Clark, Duncan G. D.; Kimber, Ian D.; and May, Roderick G., to EMI Limited. Communication over noisy lines. 4,517,679, Cl. 375-37.000.

Clark Equipment Company: *See*—
Sagaser, Thomas M., 4,516,439, Cl. 74-470.000.

Clarke, David G.: *See*—
Woodward, Antony I.; Clarke, David G.; and Shahaney, Sunil, 4,517,285, Cl. 430-538.000.

Clarke, Terence A.; Edwards, Richard B.; and Irving, Graeme N., to Lever Brothers Company. Detergent bar. 4,517,107, Cl. 252-108.000.

Clegg, Michael W.: *See*—
Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., 4,516,659, Cl. 181-243.000.

Cleland, Keith B. Ore separation system. 4,517,079, Cl. 209-452.000.

Clements, Porter, to Katalco Corporation. Shaped catalyst particle for use in hydroprocessing of petroleum oils. 4,517,077, Cl. 208-216.00R.

Cleveland, Roger C. Golf club. 4,516,778, Cl. 273-80.300.

Clinton, Henry H. Apparatus for testing the insulation of electric wire or cable. 4,517,510, Cl. 324-52.000.

Close, Rodney J.: *See*—
Mills, David; Kington, Alan D.; and Close, Rodney J., 4,516,621, Cl. 164-339.000.

Coad, Brian C., to GTE Products Corporation. Method of brazing with iron-based and hard surfacing alloys. 4,516,716, Cl. 228-263.150.

Coad, Brian C., to GTE Products Corporation. Copper based brazing alloy. 4,517,157, Cl. 420-490.000.

Coal Industry (Patents) Limited: *See*—
Eagles, Brian A., 4,516,807, Cl. 299-1.000.

Coated Electrodes Limited: *See*—
Ball, Kevin D.; and Davies, Peter, 4,517,678, Cl. 373-95.000.

Coble, Gary L. Diffuser system for annealing furnace. 4,516,758, Cl. 266-263.000.

Coffee, Edward C. J.: *See*—
Bird, Clive W.; Butler, Helene I.; Caton, Michael P. L.; Coffee, Edward C. J.; Darnbrough, Geoffrey; and Hart, Terance W., 4,517,202, Cl. 514-530.000.

Cohen, Howard; and Pakus, Edward, to Irwin Measuring Tool Inc. Illuminated device employing printed circuit board switch. 4,516,325, Cl. 33-138.000.

Coleco Industries, Inc.: *See*—
Berger, Hans S.; Mercurio, Frank; and Reiner, Norbert L., 4,516,648, Cl. 180-6.660.

Colley, Bruce H. AC-DC welding power supply. 4,517,439, Cl. 219-130.330.

Collo GmbH: *See*—
Ehlenz, Peter; and Irgel, Lutz, 4,517,308, Cl. 502-401.000.

Combustion Engineering, Inc.: *See*—
Russell, Cornelius R., 4,516,631, Cl. 165-47.000.

Commissariat a l'Energie Atomique: *See*—
Boyer, Robert; and Duval, Claude, 4,517,462, Cl. 250-286.000.
Conche, Francois; and Naujalis, Pierre, 4,516,436, Cl. 73-863.850.

Commonwealth of Australia, The: *See*—
Kuzma, Janusz, 4,516,820, Cl. 339-48.000.

Compagnie d'Electronique et de Piezo-Electricite: *See*—
Berte , Marc; Bidard, Louis; and Lechopier, Serge, 4,517,485, Cl. 310-320.000.

Compagnie General d'Electricite: *See*—
Fauvarque, Jean-Francois; Jutand, Anny; Chevrot, Claude; Pfluger, Fernando; and Troupel, Michel, 4,517,061, Cl. 204-59.00R.

Compton, David J.: *See*—
Nix, Richard; and Compton, David J., 4,516,748, Cl. 248-1.000.

Compton, Warren L. Truck cover. 4,516,802, Cl. 296-98.000.

Comtech Telecommunications Corp.: *See*—
Di Cicco, Thomas A., 4,517,526, Cl. 330-284.000.

Concast Incorporated: *See*—
Poran, Michael; Langner, Carl; and Tobiasz, Chester C., 4,516,624, Cl. 164-418.000.

Conche, Francois; and Naujalis, Pierre, to Commissariat a l'Energie Atomique. Liquid sampling bench. 4,516,436, Cl. 73-863.850.

Connelly, Dale L. Cylinder driven reciprocator. 4,516,478, Cl. 92-137.000.

Consito SpA: *See*—
Busacca, Giuseppe, 4,517,166, Cl. 423-474.000.

Continental Can Company: *See*—
Merchant, Harish D.; and Lossack, Edgar, 4,517,034, Cl. 148-439.000.

Continental Gummi-Werke Aktiengesellschaft: *See*—
Seitz, Hans; Frerichs, Udo; Rach, Heinz-Dieter; and Spendel, Siegmund, 4,516,617, Cl. 157-1.000.

Continental Packaging Company, Inc.: *See*—
Walter, John, 4,516,684, Cl. 215-272.000.

Control Fluidics, Inc.: *See*—
Tufts, Wesley M., 4,516,280, Cl. 4-319.000.

Cook, Melvin S., to Duval Corporation. Electrolytic cell. 4,517,064, Cl. 204-105.00R.

Cooper, Jerry W.: *See*—
Hughes, William E.; Dare, Keith E.; and Cooper, Jerry W., 4,517,404, Cl. 174-47.000.

Cooper LaserSonics, Inc.: *See*—
Wuchinich, David G., 4,516,398, Cl. 604-22.000.
CooperVision, Inc.: *See*—
Gerhard, Gregory J.; and Graham, William M., 4,516,575, Cl. 128-305.000.
Copar Corporation: *See*—
Schmidt, Robert W., 4,516,702, Cl. 222-514.000.
Cordis Corporation: *See*—
Garcia, Leonard M., 4,516,584, Cl. 128-785.000.
Cordts, Howard P.; and Karloske, Joan E., to Freeman Chemical Corporation. Aqueous liquid filled polyurethane gels and method of making the same. 4,517,326, Cl. 524-310.000.
Core, Grant M. Round hay baling machine. 4,516,389, Cl. 56-341.000.
Corke, Nicholas T.: *See*—
Read, Michael R.; and Corke, Nicholas T., 4,517,340, Cl. 525-113.000.
Cornell Research Foundation, Inc.: *See*—
Cummins, James N.; Aldwinckle, Herb S.; and Byers, Ross E., 4,516,353, Cl. 47-58.000.
Cornet, Jean, to Thomson-CSF. Optical disc humidity protected. 4,517,574, Cl. 346-135.100.
Coronado, Rodolfo A. Device for picking up and handling drafting templates, triangles and the like. 4,516,800, Cl. 294-64.100.
Corpataux, Marcel, to USIFLAMME S.A. Clip for writing pen or similar object. 4,516,869, Cl. 401-131.000.
Corrales, Patrick G.: *See*—
Borsuk, Leslie M.; and Corrales, Patrick G., 4,516,829, Cl. 350-96.200.
Corrie, John D.: *See*—
Brown, Christopher R.; Corrie, John D.; and Wilson, William G. J., 4,517,673, Cl. 371-36.000.
Cosentino, Louis C.: *See*—
Amiot, Bruce P.; Fuller, Larry E.; Martinez, Felix J.; Cosentino, Louis C.; Harm, William H.; and Nelson, Wayne L., 4,517,081, Cl. 210-85.000.
Costruzioni Aeronautiche Giovanni Agusta S.p.A.: *See*—
Caramaschi, Vittorio; and Castelli, Pier Luigi, 4,516,909, Cl. 416-134.00A.
Cotte, Daniel: *See*—
Chanal, Roger; and Cotte, Daniel, 4,516,601, Cl. 137-510.000.
Coue, Maurice, to Huret et ses Fils. Detecting device in particular for driving a bicycle counter. 4,517,450, Cl. 235-95.00R.
Coue , Maurice E. L., to Huret et ses Fils. Derailleur having an adjustable fork member for a crank-gear. 4,516,961, Cl. 474-80.000.
Coulter Corporation: *See*—
Pedroso, Raul I.; and Coulter, Robert S., 4,516,437, Cl. 73-864.220.
Coulter Electronics, Inc.: *See*—
Drury, F. Robert; and Graham, Marshall D., 4,516,522, Cl. 118-120.000.
Coulter, Robert S.: *See*—
Pedroso, Raul I.; and Coulter, Robert S., 4,516,437, Cl. 73-864.220.
Cournoyer, Roger J. A. Household cleaning kit. 4,516,676, Cl. 206-226.000.
Coy, Charles H., to Williams, Richard H.; DeBolt, Marion L.; and Burry, Daniel C. Frequency resonance heater. 4,517,427, Cl. 219-10.510.
Crain, N. Robert; and Richert, Carson T., to Radiant Technology Corporation. Infrared furnace with atmosphere control capability. 4,517,448, Cl. 219-388.000.
Crandall, John A. Carbon isotope analysis of hydrocarbons. 4,517,461, Cl. 250-282.000.
Crane, Patrick. Sewer pipeline cleaning apparatus. 4,516,286, Cl. 15-104.120.
Crapanzano, Joseph R. Fishing plug and lure organizer. 4,516,707, Cl. 224-202.000.
Crawford, David L., to Benckiser-Knapsack GmbH. Composition for treating fish to increase fish yield. 4,517,208, Cl. 426-332.000.
Crawford, Joseph A., to Advance Transformer Co. Sequence start lamp ballast with current spike suppression means. 4,517,498, Cl. 315-323.000.
Crawford, Tad E. Artificial camouflage leaf construction. 4,517,230, Cl. 428-17.000.
Credelle, Thomas L.: *See*—
Glock, Thomas L.; and Credelle, Thomas L., 4,517,489, Cl. 313-422.000.
Crenshaw, Ronnie R.; and Algieri, Aldo A., to Bristol-Myers Company. Intermediates for preparing 3,4-diamino-1,2,5-thiadiazoles. 4,517,366, Cl. 546-231.000.
Cress, Hobart A.: *See*—
Brewer, John H.; and Cress, Hobart A., 4,516,882, Cl. 405-224.000.
Crimmins, Arthur G., Jr., to Quill Licensing. Finger control system. 4,516,939, Cl. 434-114.000.
Croley, Thomas E., to Williamette Industries, Inc. Disposable container assembly for liquids or semi-liquids in bulk. 4,516,692, Cl. 222-105.000.
Crosfield Data Systems, Inc.: *See*—
Provisor, Zvi; and Burford, Henry H. T., Jr., 4,517,638, Cl. 364-146.000.
Cruickshank, E. J.; and Ekland, Joseph D., to Federal-Mogul Corporation. Abrasive cutting wheel and method of cutting abradable material. 4,516,560, Cl. 125-15.000.
Cruver, Michael B.: *See*—
Madison, David P.; and Cruver, Michael B., 4,516,487, Cl. 99-450.600.
Crystaloid Electronics Company: *See*—
Ferrato, Joseph P., 4,516,836, Cl. 350-336.000.
Csapo, Erich: *See*—
Prunbauer, Kurt; and Csapo, Erich, 4,516,416, Cl. 70-276.000.
Cuffiani, Illaro; Longi, Paolo; Zucchini, Umberto; and Pennini, Gianni, to Montedison S.p.A. Catalyst components for the polymerization of ethylene and of mixtures thereof with olefins and catalysts obtained therefrom. 4,517,307, Cl. 502-119.000.
Cuisi-Technic S.a.r.l.: *See*—
Mantelet, Jean, 4,517,454, Cl. 219-455.000.
Cukier, Samuel; and Kremer, Henry A. F. L., to Domtar Inc. Process for modifying coal tar materials. 4,517,072, Cl. 208-45.000.
Cummins, James N.; Aldwinckle, Herb S.; and Byers, Ross E., to Cornell Research Foundation, Inc. Method of producing vole-resistant apple trees and trees produced thereby. 4,516,353, Cl. 47-58.000.
Cunningham, Robert E., to United States of America, National Aeronautics and Space Administration. Varible force, eddy-current or magnetic damper. 4,517,505, Cl. 318-611.000.
Cupp, Carl J.: *See*—
Farrar, Frank W.; and Cupp, Carl J., 4,516,346, Cl. 42-50.000.
Curran, John J. Container divider. 4,516,717, Cl. 229-15.000.
Curro, Dominic, Jr., to Loroco Industries, Inc. Protector for the core and adjacent edges and face portions of a coil of material. 4,516,892, Cl. 410-155.000.
Cuttler, Luis, to FAOSA - Fabrica de Armazones Opticos, S.A. Separable holder for keys and the like. 4,516,418, Cl. 70-456.00R.
D. Halmi And Associates Inc.: *See*—
Halmi, Dezsoe, 4,516,434, Cl. 73-861.640.
D&K Custom Machine Design, Inc.: *See*—
Singer, Karl, 4,517,042, Cl. 156-164.000.
Dacier, Jacques, to Ateliers de Constructions Electriques de Charleroi (ACEC). Double gap electric generating machines. 4,517,484, Cl. 310-266.000.
Dahle, Gerald, to Wilhelm Dahle Buro- und Zeichengeratefabrik. Paper cutter. 4,516,452, Cl. 83-455.000.
Dahm, Manfred; Weimann, Norbert; Nehen, Ulrich; Muller, Hanns P.; Jabs, Gert; Awater, Albert; and Barnes, James M., to Bayer Aktiengesellschaft. Production of microcapsules having walls of polyaddition products of water-insoluble polyamines with water-soluble polyisocyanate adducts. 4,517,141, Cl. 264-4.700.
Daido Tokushuko Kabushiki Kaisha: *See*—
Inaba, Hideaki; and Sakakibara, Shuzi, 4,517,015, Cl. 75-12.000.
Daihatsu Motor Company: *See*—
Nakahara, Mitsuharu; Ishida, Tomio; Honjo, Norifumi; and Yoshida, Yoshitaka, 4,516,537, Cl. 123-48.0AA.
Daikin Kogyo Co., Ltd.: *See*—
Hisamoto, Iwao; Omure, Yukio; and Ishikawa, Sueyoshi, 4,517,108, Cl. 252-162.000.
Daimler-Benz Aktiengesellschaft: *See*—
Worner, Gunter; Kosik, Franz; and Gosele, Hartmut, 4,516,955, Cl. 464-89.000.
Dainippon Screen Manufacturing Co., Ltd.: *See*—
Maeda, Kiyoshi; and Okamoto, Masashi, 4,517,608, Cl. 358-298.000.
Daiwa Seiko Co., Ltd.: *See*—
Hirose, Haruomi; and Yamazaki, Akio, 4,516,348, Cl. 43-17.000.
Daiwa Seiko Inc.: *See*—
Hashimoto, Hiroshi, 4,516,741, Cl. 242-217.000.
D'Alelio, Gaetano F., deceased (by St. Joseph Bank and Trust Company, executor), to Plastics Engineering Company. Polysulfone compositions and derivatives thereof. 4,517,354, Cl. 528-172.000.
D'Alelio, Gaetano F., deceased (St. Joseph Bank and Trust Company, legal representative); and Waitkus, Phillip A., to Plastics Engineering Company. Vinylacetylene-terminated polyimide derivatives. 4,517,363, Cl. 546-66.000.
D'Alelio, Gaetano F., deceased (by St. Joseph Bank and Trust Company, executor); and Waitkus, Phillip A., to Plastics Engineering Company. Vinylacetylene-terminated polyimide derivatives. 4,517,364, Cl. 546-66.000.
D'Alessio, Michael; and Matcovich, Charles, to Harsco Corporation. Safety device. 4,516,663, Cl. 187-19.000.
Dalmo Victor Operations, Bell Aerospace Textron, Div. of Textron, Inc.: *See*—
Pon, Chuck Y., 4,517,535, Cl. 333-81.00A.
Dare, Keith E.: *See*—
Hughes, William E.; Dare, Keith E.; and Cooper, Jerry W., 4,517,404, Cl. 174-47.000.
Darnbrough, Geoffrey: *See*—
Bird, Clive W.; Butler, Helene I.; Caton, Michael P. L.; Coffee, Edward C. J.; Darnbrough, Geoffrey; and Hart, Terance W., 4,517,202, Cl. 514-530.000.
Dasurat Enterprises PTE Ltd.: *See*—
Mason, James W., 4,517,316, Cl. 521-81.000.
Data Acquisition Services: *See*—
Williams, Daniel E.; Carley, John J.; and Eaton, Paul S., 4,517,410, Cl. 179-6.040.
Data General Corporation: *See*—
Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., 4,517,642, Cl. 364-200.000.
David, Jean: *See*—
Chollet, Christian; and David, Jean, 4,516,425, Cl. 73-198.000.
Davidge, Peter C.: *See*—
Alderton, Geoffrey W.; and Davidge, Peter C., 4,516,966, Cl. 494-1.000.
Davids, Robert E., to International Game Technology. Three dimensional video screen display effect. 4,517,558, Cl. 340-700.000.

Davies, Jeffrey W.: *See*—
Markham, Peter G.; Townsend, Rodney; and Davies, Jeffrey W., 4,517,177, Cl. 424-93.000.

Davies, Peter: *See*—
Ball, Kevin D.; and Davies, Peter, 4,517,678, Cl. 373-95.000.

Davis, Duane L. Ratchet device. 4,516,442, Cl. 74-529.000.

Davis, Jeffrey J., to Imnetec Inc. Universal vent device and method for ostomy appliances. 4,516,974, Cl. 604-333.000.

Davis, Stanley: *See*—
Stocco, Sam; and Davis, Stanley, 4,516,765, Cl. 271-95.000.

Davis, William F., to Motorola, Inc. High frequency operational amplifier. 4,517,524, Cl. 330-257.000.

Davison, Ernest: *See*—
Maczuszenko, Andrzej; Davison, Ernest; Otter, Brian; Whittaker, Brian F.; Novak, Christopher; and Landheer, Dolf, 4,516,847, Cl. 355-3.0TR.

Dayco Corporation: *See*—
Hughes, William E.; Dare, Keith E.; and Cooper, Jerry W., 4,517,404, Cl. 174-47.000.

De La Rue Giori S.A.: *See*—
Giori, Gualtiero, 4,516,496, Cl. 101-152.000.

De La Rue Systems Limited: *See*—
Wood, John; Tinson, Christopher M.; and Jenkins, Stuart M., 4,516,899, Cl. 414-330.000.

Dean, Walter C., II, to Budd Company, The. Mechanical stop mechanism for a tilt system in a railway car. 4,516,507, Cl. 105-199.00A.

DeBolt, Marion L.: *See*—
Coy, Charles H., 4,517,427, Cl. 219-10.510.

Decker, Richard B.: *See*—
Bettcher, Louis A.; and Decker, Richard B., 4,516,323, Cl. 30-276.000.

Degussa Aktiengesellschaft: *See*—
Eiermann, Kurt; and Kayser, Thomas, 4,516,872, Cl. 403-24.000.
Wolff, Siegfried; Grewatta, Heinz; and Buder, Wolfgang, 4,517,335, Cl. 524-552.000.
Wolff, Siegfried; and Tan, Ewe-Hong, 4,517,336, Cl. 524-571.000.

de Haan, Herman P.: *See*—
May, Joseph R.; Petruccelli, Frank; Lang, Robert L.; and de Haan, Herman P., 4,517,231, Cl. 428-35.000.

Deibl, Gottfried: *See*—
Thone, Heinrich; Hargassner, Reinhard; Deibl, Gottfried; and Holleis, Gunter, 4,516,622, Cl. 164-416.000.

Deitch, Leonard; and Knowles, Terrance, to Zenith Electronics Corporation. Optical gating scheme for display touch control. 4,517,559, Cl. 340-712.000.

Delalande S.A.: *See*—
Ancher, Jean-Francois R.; Bourgery, Guy R.; Dostert, Philippe L.; Douzon, Colette A.; Guerret, Patrick G.; Lacour, Alain P.; and Langlois, Michel, 4,517,197, Cl. 514-376.000.

De Larm, James B. Heating device. 4,516,563, Cl. 126-101.000.

Delia, Anthony, to Drackett Company, The. Child-resistant closure. 4,516,683, Cl. 215-211.000.

Delma- elektro- und medizinische Apparatebau Gesellschaft mbH: *See*—
Roos, Eberhard, 4,517,632, Cl. 362-389.000.

Delman, Ralph. Insulated plastic frame for doors, windows and the like. 4,516,356, Cl. 49-504.000.

DeLoach, John R.; Harris, Robert L.; Mayer, Richard T.; and Ihler, Garret M., to United States of America, Agriculture. Apparatus for encapsulating additives in resealed erythrocytes. 4,517,080, Cl. 210-85.000.

Delonge, Jean-Claude L.: *See*—
Bouiller, Jean G.; Delonge, Jean-Claude L.; Rigo, Marcel L. A.; and Zietek, Didier G., 4,516,910, Cl. 416-190.000.

Delphax Systems: *See*—
Maczuszenko, Andrzej; Davison, Ernest; Otter, Brian; Whittaker, Brian F.; Novak, Christopher; and Landheer, Dolf, 4,516,847, Cl. 355-3.0TR.

Delrieu, Jean-Marc: *See*—
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.

Delta Engineering Ltd.: *See*—
Halmos, George T., 4,516,370, Cl. 52-245.000.

Dembowski, Peter V.; and Dobras, Quentin D., to General Electric Company. Fluorescent lamp with cathode heat switches. 4,517,493, Cl. 315-73.000.

Demizu, Michinosuke: *See*—
Okumura, Mitsuhiro; Naya, Eizo; and Demizu, Michinosuke, 4,517,033, Cl. 148-432.000.

de Niet, Edmond: *See*—
Rijckaert, Albert M. A.; and de Niet, Edmond, 4,517,612, Cl. 360-67.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,517,348, Cl. 526-273.000.

Dennis, Linda H. Cross stitch ribbon. 4,516,609, Cl. 139-383.00R.

Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., to General Electric Company. Self-test subsystem for nuclear reactor protection system. 4,517,154, Cl. 376-259.000.

De Ponti, Luigi, to Alfonso Bialetti & C., Fonderia in Conchiglia S.p.A. Household appliance for preparing hot beverages. 4,516,484, Cl. 99-279.000.

DeReggi, Aime S.; and Harris, Gerald R., to United States of America, Health and Human Services. Acoustically transparent hydrophone probe. 4,517,665, Cl. 367-163.000.

Derek and Derek: *See*—
Brand, Derek A.; Brand, Derek R.; and Brand, Kenneth J., 4,516,952, Cl. 446-427.000.

Derner, Paul; Eckardt, Rudolf; and Neuendorf, Hans-Christoph, to Flachglas Aktiengesellschaft. Method of and apparatus for vacuum shaping a glass sheet. 4,516,997, Cl. 65-106.000.

Design Professionals Financial Corporation: *See*—
Howell, Edward B., 4,517,514, Cl. 324-207.000.

Dessau, Ralph M.; and Kerr, George T., to Mobil Oil Corporation. Catalysis over activated zeolites. 4,517,075, Cl. 208-111.000.

Dessau, Ralph M., to Mobil Oil Corporation. Selective sorption of linear aliphatic compounds by zeolites. 4,517,402, Cl. 585-820.000.

Deters, Paul M. Electrical jumper assembly. 4,516,817, Cl. 339-19.000.

Dettke, Manfred; and Klein, Rudolf, to Schering Aktiengesellschaft. Method and bath for electrodepositing a violet-colored gold-copper-bismuth alloy. 4,517,060, Cl. 204-44.000.

DeVale, Donald P.; Brejcha, Robert J.; and Van Naarden, Robert W., to Industrial Design Electronic Associates, Inc. Dart game with two microcomputers. 4,516,781, Cl. 273-373.000.

Development Finance Corporation of New Zealand: *See*—
Brookes, David L.; Weatherly, John D.; and Dillicar, Colin R., 4,516,770, Cl. 273-11.00R.

Devine, James B. Apparatus for sampling paper pulp liquor. 4,517,053, Cl. 162-251.000.

DeVlieg Machine Company: *See*—
Ortlieb, Robert M., 4,516,889, Cl. 408-152.000.

DeWitt, Kenneth W.: *See*—
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Di Cicco, Thomas A., to Comtech Telecommunications Corp. Digitally controlled AGC amplifier. 4,517,526, Cl. 330-284.000.

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Martin, John C.; and Martin, Paul H., 4,516,594, Cl. 137-15.000.

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Meinzer, Richard A.; and Dobbs, Gregory M., 4,517,676, Cl. 372-89.000.

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Dr. Johannes Heidenhain GmbH: *See*—
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Hayes, Willliam; and Dohrenwend, James W., 4,517,083, Cl. 210-131.000.
Dollst, Klaus. Apparatus for heating and drying shoes. 4,517,443, Cl. 219-215.000.
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Donahue, John M.; and Gagner, Michael J., to Gradall Company, The. Remote drive with powershift transmission. 4,516,655, Cl. 180-321.000.
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Doscher, Todd M. Enhanced steam drive recovery of heavy oil. 4,516,636, Cl. 166-272.000.
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Dorman, Linneaus C.; and Stenger, Vernon A., 4,517,111, Cl. 252-186.250.
Hefner, Robert E., Jr., 4,517,131, Cl. 260-465.00F.
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Drackett Company, The: *See*—
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Drake, Cyril F.; and Jones, Ronald, to ITT Industries, Inc. Composite materials comprising water-soluble glass particles. 4,517,006, Cl. 71-64.110.
Drepa, James R.; and Drozd, Edward J., to Captive Plastics Inc. Liquid product dispenser. 4,516,697, Cl. 222-212.000.
Driscoll, Michael A.; and Edwards, James H., to Millipore Corporation. Filtration devices. 4,517,085, Cl. 210-232.000.
Drockila, Kalevi, to Rauma-Repola Oy. Means for marking timber packages. 4,516,526, Cl. 118-697.000.
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Drury, F. Robert; and Graham, Marshall D., to Coulter Electronics, Inc. Slide preparation apparatus. 4,516,522, Cl. 118-120.000.
Drutchas, Gilbert H.; and Spencer, Phillip B., to TRW Inc. Pump assembly. 4,516,918, Cl. 418-15.000.
Du Pont-Mitsui Polychemicals Co., Ltd.: *See*—
Tada, Seiichi, 4,517,317, Cl. 521-95.000.
Duchateau, Claude M., to Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestres et Amphibies S.E.D.A.M. Vehicles travelling on air cushions allowing movement of the latter over all types of terrain. 4,516,651, Cl. 180-127.000.
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Duffy, James J., to Ford Motor Company. Power steering valve with chamfered lands. 4,516,471, Cl. 91-375.00A.
Dufner, Donald E. Crop clearing mechanism. 4,516,789, Cl. 280-160.000.
Dugan, J. Joseph. Counterweight door structure. 4,516,354, Cl. 49-387.000.
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Dunwald, Willi: *See*—
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Freytag, J. William; and Litchfield, William J., 4,517,303, Cl. 436-501.000.
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Krahler, Stanley E.; and Remington, William R., 4,517,376, Cl. 560-87.000.
Seago, James L., 4,517,291, Cl. 435-14.000.
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Dynamit Nobel AG: *See*—
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Eastern Company, The: *See*—
MacPherson, David B.; Paris, Jay E.; Foley, Robert W.; Greinier, Martin W.; and Pulsifer, David N., 4,516,281, Cl. 4-319.000.
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Eastridge, Victor R.; and Milani, John C. Cigarette extinguisher. 4,516,587, Cl. 131-256.000.
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Yamanaka, Koichi; Gotoh, Tetsuro; Aoki, Masanori; Kataoka, Isao; and Nishiwaki, Shunro, 4,517,091, Cl. 210-512.100.
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Edelmann, Ludwig: *See*—
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Edwards Alto Vuoto S.p.A.: *See*—
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Edwards, Samuel S. Wind energy converter utilizing vortex augmentation. 4,516,907, Cl. 415-2.00A.
Effland, Richard C.; Klein, Joseph T.; and Hamer, R. Richard L., to Hoechst-Roussel Pharmaceuticals Inc. Pyrrolo[1,2-b][1,2,5]triazepines and pharmaceutical compositions thereof. 4,517,195, Cl. 514-413.000.

Ehlenz, Peter; and Irgel, Lutz, to Collo GmbH. Method of producing a sorptive body, particularly for eliminating odors, air freshening, etc. and the resultant product. 4,517,308, Cl. 502-401.000.

Eida, Tsuyoshi: *See—*
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Eiermann, Kurt; and Kayser, Thomas, to Degussa Aktiengesellschaft. Apparatus for fastening electric structural parts into the connecting head of electrical thermometers. 4,516,872, Cl. 403-24.000.

Eigenberger, Gerhart: *See—*
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Elworthy, John H.; and Mayston, Donald, to Protocol Engineering Limited. Making of printing plates. 4,517,036, Cl. 156-64.000.

Ely, Dusin N.; and Macarchenia, Joseph H., to B. F. Goodrich Company. Pneumatic deicer and deicing method. 4,516,745, Cl. 244-134.00A.

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EMI Limited: *See—*
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Emory University: *See—*
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Energy Development Associates, Inc.: *See—*
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Erdmannsdorfer, Hans; Wagner, Manfred; Numrich, Rudi; and Weyh, Gerd, to Filterwerk Mann & Hummel GmbH. Method of removing soot from exhaust gases. 4,516,990, Cl. 55-96.000.

Ergoplic Ltd., An Israel Company: *See—*
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Erickson, Dennis E.: *See—*
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Essex Group, Inc.: *See—*
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Evans, David M.; and Weightman, Barry O., to National Research Development Corporation. Intramedullary orthopaedic devices. 4,516,569, Cl. 128-92.0BC.

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Duvdevani, Ilan; Peiffer, Dennis G.; Eckert, John A.; and Lundberg, Robert D., 4,516,982, Cl. 44-62.000.
Lundberg, Robert D.; Phillips, Robert R.; and Peiffer, Dennis G., 4,517,333, Cl. 524-516.000.
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Ratcliffe, Charles T.; and Tromp, Petrus J., 4,517,171, Cl. 423-648.00R.
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Eyman, Ralph A., to United States of America, Army. Quick access splice for missile sections. 4,516,499, Cl. 102-293.000.

Fabre, Jean M.: *See—*
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Fabricius, Hans-Ake; and Stahn, Roland, to Hooper Trading Co. N.V. High yield process for in vitro production of serum-free and mitogen-free interleukin-2 using a roller bottle culture system. 4,517,293, Cl. 435-68.000.

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Fairchild Camera And Instrument Corporation: *See—*
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Farrar, Frank W.; and Cupp, Carl J., to Pachmayer Gun Works, Inc. Magazine for guns. 4,516,346, Cl. 42-50.000.

Fauser, Friedrich; and Fischer, Willi, to Leybold-Heraeus GmbH. Method and apparatus for short-path distillation. 4,517,057, Cl. 202-205.000.

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Fauvarque, Jean-Francois; Jutand, Anny; Chevrot, Claude; Pfluger, Fernando; and Troupel, Michel, to Compagnie General d'Electricite; and Centre National de la Recherche Scientifique (CNRS). Process for preparing arylacetic and arylpropionic acids. 4,517,061, Cl. 204-59.00R.

FBC Limited: *See—*
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Hoffman, David M.; Feher, John J.; and Farmer, Homer H., 4,517,103, Cl. 252-28.000.

Felger, Carl B., to Gillette Company, The. Anticholinergic glucuronide compounds and antiperspirant use thereof. 4,517,176, Cl. 424-47.000.

Felix, Arthur M.; Gillessen, Dieter; Lergier, William; Meienhofer, Johannes A.; and Trzeciak, Arnold, to Hoffmann-La Roche Inc. Synthesis of thymosin $\alpha_1$. 4,517,119, Cl. 260-112.50R.

Feller, Samuel. Rollable grating system. 4,516,377, Cl. 52-660.000.

Fennel, Helmut, to ITT Industries, Inc. Method of and arrangement for providing numerical values indicative of relationsips between pulse train pulses. 4,517,684, Cl. 377-19.000.

Ferguson, John W.: *See*—
Meeker, Brian L.; Ferguson, John W.; and Werner, Henry G., 4,517,236, Cl. 428-192.000.

Ferguson, Larry W.; and McFarland, Roger A., to Owens-Corning Fiberglas Corporation. Molded products. 4,517,323, Cl. 523-514.000.

Ferrato, Joseph P., to Crystaloid Electronics Company. Conductor for use in electro-optical displays. 4,516,836, Cl. 350-336.000.

Ferrell, Philip J.; Stern, Alan D.; and McFarland, Melvin D., to Boeing Company, The. Fault scoring and selection circuit and method for redundant system. 4,517,639, Cl. 364-186.000.

Ferri, Mario: *See*—
Mercati, Giorgio; Mariano, Armando; Pertot, Fulvio; Glionna, Antonio; and Ferri, Mario, 4,517,355, Cl. 528-287.000.

Ferris Manufacturing Corp.: *See*—
Sessions, Robert W., 4,516,581, Cl. 128-639.000.

Fesler, Ethel L. Portable towel accessory. 4,516,616, Cl. 150-52.00R.

Fiber-Lite Corporation: *See*—
Meeker, Brian L.; Ferguson, John W.; and Werner, Henry G., 4,517,236, Cl. 428-192.000.

Fillard, Jean-Pierre: *See*—
Gasiot, Jean; Braunlich, Peter F.; and Fillard, Jean-Pierre, 4,517,463, Cl. 250-327.200.

Filter, Reinhard; and Stonkus, Donald J. Loadbreak bushing and snuffer/contact assembly therefor. 4,516,823, Cl. 339-111.000.

Filterwerk Mann & Hummel GmbH: *See*—
Erdmannsdorfer, Hans; Wagner, Manfred; Numrich, Rudi; and Weyh, Gerd, 4,516,990, Cl. 55-96.000.

Finlayson, Claude M.: *See*—
Mardis, Wilbur S.; and Finlayson, Claude M., 4,517,112, Cl. 252-315.200.

Finn, Arnold H., to Taco Products, Incorporated. Tool handle attachment. 4,516,615, Cl. 81-20.000.

Finn, Clifford J., to Universal Foam Systems, Inc. Solvent flushing arrangement for foam dispensing gun. 4,516,694, Cl. 222-148.000.

Finney, John F. Means for and method of furnace insulation. 4,516,374, Cl. 52-404.000.

Fiorucci, Louis C.; and Gregory, Kevin M., to Olin Corporation. Purification of alkali metal nitrates. 4,517,164, Cl. 423-184.000.

Firestone Tire & Rubber Company, The: *See*—
Yang, James H. C.; and Tomaszewski, Walter, 4,516,874, Cl. 403-313.000.

Firmin, Herman P., to Knight Manufacturing Company, Inc. Artificial crawfish lure with dorsal and ventral seam. 4,516,352, Cl. 43-42.260.

Firth, Donald. Method and apparatus for conveying and metering solid material. 4,516,674, Cl. 198-617.000.

Fischer, Artur. Anchoring device. 4,516,378, Cl. 52-704.000.

Fischer, Willi: *See*—
Fauser, Friedrich; and Fischer, Willi, 4,517,057, Cl. 202-205.000.

Fisher, Howard Z., to AMP Incorporated. Heat recoverable sleeve forming wrap. 4,517,234, Cl. 428-119.000.

Fishery Products, Inc.: *See*—
Murphy, Gordon D.; and Bishop, Ernest C., 4,517,206, Cl. 426-115.000.

Fizyta, Wojciech L.; and Kaumeheiwa, Algen K., to Chrysler Corporation. Windshield washer dual spray nozzle. 4,516,288, Cl. 15-250.040.

Fjalkinge Potato Processing Machinery AB: *See*—
Haraldsson, Roland; Bengtsson, Jan; and Friberg, Claes, 4,517,211, Cl. 426-444.000.

Flachglas Aktiengesellschaft: *See*—
Derner, Paul; Eckardt, Rudolf; and Neuendorf, Hans-Christoph, 4,516,997, Cl. 65-106.000.

Fleshler, Bernard. Acoustical attenuating device and chair equipped therewith. 4,516,656, Cl. 181-175.000.

Fletcher, Charles W.: *See*—
Dieckmann, Dale J.; and Fletcher, Charles W., 4,517,115, Cl. 252-400.00R.

Fletcher, Paul E.: *See*—
Johnson, Robert S.; Fletcher, Paul E.; Benjamin, William S.; and Zsitvay, John L., 4,516,287, Cl. 15-119.00A.

Fletcher, Stephen R.: *See*—
Lotito, Vincent; and Fletcher, Stephen R., 4,516,529, Cl. 119-5.000.

Flodman Guns KB: *See*—
Flodman, Rune, 4,516,345, Cl. 42-46.000.

Flodman, Rune, to Flodman Guns KB. Cartridge ejector device for firearms. 4,516,345, Cl. 42-46.000.

Flohn, Paul H., to North American Philips Lighting Corporation. Precision rotating rod guide. 4,516,446, Cl. 82-38.00A.

Fluor Subsea Services, Inc.: *See*—
Brewer, John H.; and Cress, Hobart A., 4,516,882, Cl. 405-224.000.

FMC Corporation: *See*—
Gotal, John D.; and Scott, Junius D., 4,517,500, Cl. 318-130.000.

Fogel, Harvey P., to General Foods Corporation. Process for preparing a fruit and cereal product. 4,517,210, Cl. 426-392.000.

Foley, Robert W.: *See*—
MacPherson, David B.; Paris, Jay E.; Foley, Robert W.; Greinier, Martin W.; and Pulsifer, David N., 4,516,281, Cl. 4-319.000.

Foll, William A., Sr.: *See*—
Buckner, Leonard; Foll, William A., Sr.; and Pesho, Stephen W., 4,516,380, Cl. 53-282.000.

Forbes, Hampton E., Jr., to Westvaco Corporation. Carton with automatic lock. 4,516,718, Cl. 229-33.000.

Force, Carlton G.: *See*—
Gowan, John W., Jr.; and Force, Carlton G., 4,517,347, Cl. 526-216.000.

Ford Motor Company: *See*—
Duffy, James J., 4,516,471, Cl. 91-375.00A.

Forestier, Serge: *See*—
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,517,174, Cl. 424-62.000.

Fortino, Dennis J.: *See*—
Miller, John E.; and Fortino, Dennis J., 4,516,785, Cl. 277-188.00A.

Fortuin, Harm: *See*—
Meulenbrugge, Hendrik J.; and Fortuin, Harm, 4,517,460, Cl. 250-252.100.

Fotiadis, Emanuel; Kozol, Edward J.; Leung, Tak L.; and Paul, Robert J., to International Business Machines Corporation. Floppy disk canister. 4,516,678, Cl. 206-444.000.

Foundation: The Research Institute of Electric and Magnetic Alloys, The: *See*—
Masumoto, Hakaru; and Nakamura, Naoji, 4,517,156, Cl. 420-463.000.

Fournel, Andre : *See*—
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.

Fox, James W.; and Hill, Robert J., to G & W Electric Company. High voltage cable terminator and method of assembly. 4,517,407, Cl. 174-73.00R.

Fox, Joseph R.: *See*—
Pesa, Frederick A.; Blaskie, Marcus W.; and Fox, Joseph R., 4,517,400, Cl. 585-638.000.

Framatome & Cie: *See*—
Dumont, Pascal G.; and Chiron, Daniel M., 4,516,426, Cl. 73-432.00R.

Francis, John F., to Gillette Company, The. Safety razors. 4,516,321, Cl. 30-50.000.

Francis, Thomas L.; and Phelps, Frankie E., to Aluminum Company of America. Refractory composition comprising nitride filler and colloidal sol binder. 4,517,037, Cl. 156-89.000.

Frank, G. Haven, to United States of America, Air Force. Protection circuitry for high voltage drivers. 4,517,618, Cl. 361-58.000.

Freebery, Joseph J. Apparatus for removal of paving material. 4,516,896, Cl. 414-740.000.

Freeburg, Thomas A.; and Krebs, Jay, to Motorola, Inc. Method and apparatus for coding messages communicated between a primary station and remote stations of a data communications system. 4,517,669, Cl. 370-82.000.

Freeland, Warwick P., to W. A. Deutsher Proprietary Limited. Closure cap having integrated fastening means. 4,516,688, Cl. 220-293.000.

Freeman Chemical Corporation: *See*—
Cordts, Howard P.; and Karloske, Joan E., 4,517,326, Cl. 524-310.000.

Frees, Kenneth A.: *See*—
Cavin, J. N.; and Frees, Kenneth A., 4,516,905, Cl. 414-620.000.

Freese, Edward O.: *See*—
Hampel, Lawrence E.; and Freese, Edward O., 4,516,790, Cl. 280-502.000.

French, Michael J. Supporting a container with respect to a plate. 4,516,685, Cl. 220-23.830.

Frerichs, Udo: *See*—
Seitz, Hans; Frerichs, Udo; Rach, Heinz-Dieter; and Spendel, Siegmund, 4,516,617, Cl. 157-1.000.

Fresenius, AG: *See*—
Herbert, Reinhold, 4,516,977, Cl. 604-415.000.

Frew, John W.; and Robbins, Kenneth W., to Sperry Corporation. High resolution and high accuracy time interval generator. 4,516,861, Cl. 368-120.000.

Freytag, J. William; and Litchfield, William J., to Du Pont de Nemours, E. I., and Company. Specific binding assays utilizing analyte-cytolysin conjugates. 4,517,303, Cl. 436-501.000.

Friberg, Claes: *See*—
Haraldsson, Roland; Bengtsson, Jan; and Friberg, Claes, 4,517,211, Cl. 426-444.000.

Frick Company: *See*—
Murphy, David A.; and Spellar, Peter C., 4,516,914, Cl. 417-282.000.

Fricke, Hans-Jurgen, to Robert Bosch GmbH. Hydrostatic piston machine. 4,516,475, Cl. 92-57.000.

Friedrich, Ludwig: *See*—
Schlecker, Rainer; Friedrich, Ludwig; and Lenke, Dieter, 4,517,196, Cl. 514-371.000.

Frink, Attila; and Morrison, Robert A., to Lockheed Corporation. Circuit board housing with zero insertion force connector. 4,517,625, Cl. 361-399.000.

Frito-Lay, Inc.: *See*—
Mottur, George P.; and Glass, Richard W., 4,517,204, Cl. 426-94.000.

Fritschi, Edgar: *See*—
Barth, Hubert; Fritschi, Edgar; Ganser, Volker; Hartenstein, Johannes; Herrmann, Manfred; and Satzinger, Gerhard, 4,517,185, Cl. 514-232.000.

Fritz, Herbert L.: *See*—
Johnson, Daniel D.; and Fritz, Herbert L., 4,517,050, Cl. 156-643.000.

Fuerniss, Stephen J.: *See*—
Briney, Gary C.; and Fuerniss, Stephen J., 4,517,281, Cl. 430-322.000.

Fuhring, Heinrich, to Messerschmidt-Bolkow-Blohm GmbH. Wind turbine with gale protection. 4,517,467, Cl. 290-44.000.

Fuji Electric Company, Ltd.: *See*—
Kawasaki, Kikuo; and Sano, Tomomi, 4,517,651, Cl. 364-479.000.

Fuji Photo Film Co., Ltd.: *See*—
Hino, Hiromasa, 4,516,846, Cl. 354-465.000.
Hino, Hiromasa, 4,517,615, Cl. 360-108.000.
Noguchi, Yasuhiro; and Morigaki, Masakazu, 4,517,286, Cl. 430-562.000.
Ohmura, Hiroshi, 4,516,843, Cl. 354-173.100.
Seshimoto, Osamu, 4,517,071, Cl. 204-419.000.

Fuji Xerox Co., Ltd.: *See*—
Murayama, Tomio; Kikuchi, Yoshiki; and Ohmori, Takashi, 4,517,560, Cl. 340-790.000.
Tan, Yoichi; and Miyao, Fumio, 4,517,531, Cl. 331-14.000.

Fujimori, Noboru: *See*—
Kagawa, Nobuaki; Fujimori, Noboru; Tanaka, Shigeo; and Onodera, Kaoru, 4,517,284, Cl. 430-591.000.

Fujimoto, Kazumi: *See*—
Tsuji, Akira; Ito, Sadayuki; and Fujimoto, Kazumi, 4,517,617, Cl. 360-133.000.

Fujimoto, Kazuyuki: *See*—
Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, 4,517,444, Cl. 219-216.000.

Fujimura, Mituaki: *See*—
Masumoto, Kazuhiro; Fujimura, Mituaki; and Sawazaki, Masauki, 4,517,151, Cl. 264-540.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Imanaka, Hiroshi; Miyoshi, Toshio; Konomi, Toshio; Kubochi, Yoshiaki; Hattori, Seizirо; and Kawakita, Takeshi, 4,517,299, Cl. 435-197.000.

Fujita, Daijiro; Motoo, Akihiko; and Maki, Yoshiki, to Japan Steel Works, Ltd., The. Pelletizing die for synthetic resin extruding machine. 4,516,925, Cl. 425-463.000.

Fujita, Eiji: *See*—
Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, 4,517,282, Cl. 430-399.000.

Fujita, Shigeo: *See*—
Isono, Kiyoshi; Nakamura, Goto; and Fujita, Shigeo, 4,517,178, Cl. 424-122.000.

Fujitsu Fanuc Limited: *See*—
Imazeki, Ryoji; and Inoue, Michiya, 4,517,663, Cl. 365-222.000.

Fujitsu Limited: *See*—
Hattori, Akira; Hayashi, Hiromu; Shinagawa, Akio; and Shinogi, Tsuyoshi, 4,517,640, Cl. 364-200.000.
Ikegami, Kasumi; and Okuyama, Hirofumi, 4,517,266, Cl. 430-2.000.
Inoue, Minoru, 4,517,026, Cl. 148-1.500.
Tomita, Masayoshi, 4,516,312, Cl. 29-571.000.

Fujitsu Ten Limited: *See*—
Tanigawa, Kou; Masuda, Jiro; Nakamura, Kazumasa; and Hayashi, Kazuhiko, 4,516,652, Cl. 180-177.000.

Fujiwara, Hiroshi; Yamazaki, Hatsutaro; and Ozawa, Kazuo, to Maruzen Oil Company, Limited. Process for the production of p-vinyl phenol polymer. 4,517,349, Cl. 526-313.000.

Fujiyama, Norimasa: *See*—
Kizawa, Hidenori; Fujiyama, Norimasa; Kobayashi, Jitsuo; and Ito, Akinori, 4,517,173, Cl. 424-16.000.

Fukagawa, Yasuo: *See*—
Yoshioka, Takeo; Yamamoto, Kenichi; Fukagawa, Yasuo; Shimauchi, Yasutaka; and Ishikura, Tomoyuki, 4,517,127, Cl. 260-245.20T.

Fukasawa, Takeshi: *See*—
Kobayashi, Satoru; Masaki, Mikio; Sakuno, Hideaki; Shimizu, Keiichi; and Fukasawa, Takeshi, 4,516,415, Cl. 70-252.000.

Fukatsu, Kunio: *See*—
Yamauchi, Masahide; and Fukatsu, Kunio, 4,516,866, Cl. 400-25.000.

Fukuda, Masao, to Kabushiki Kaisha Ishida Koki Seisakusho. Apparatus for regulating flow of articles in computer scale. 4,516,644, Cl. 177-25.000.

Fukui, Tatsuyuki: *See*—
Takezawa, Susumu; Ikebe, Ken'ichi; Ayada, Haruki; Fukui, Tatsuyuki; and Okada, Munenori, 4,516,746, Cl. 244-170.000.

Fuller, Larry E.: *See*—
Amiot, Bruce P.; Fuller, Larry E.; Martinez, Felix J.; Cosentino, Louis C.; Harm, William H.; and Nelson, Wayne L., 4,517,081, Cl. 210-85.000.

Funagura, Shuichi; and Nishio, Katsufumi, to Matsushita Electric Industrial Co., Ltd. Electric food cutting machine. 4,516,733, Cl. 241-79.000.

Funakoshi, Fumio: *See*—
Morishita, Tatsuo; Funakoshi, Fumio; Nakamura, Kenichi; and Takamori, Kazuo, 4,517,564, Cl. 340-825.690.

Funamoto, Hiroyuki: *See*—
Matsuno, Kenji; and Funamoto, Hiroyuki, 4,517,256, Cl. 428-629.000.

Furrer, Andreas, to BBC Brown, Boveri & Company, Limited. Switching amplifier. 4,517,522, Cl. 330-10.000.

Fuse, Kenichiro: *See*—
Yamaguchi, Hitohisa; Fuse, Kenichiro; and Yoshida, Takeshi, 4,516,650, Cl. 180-68.300.

Fusek, Richard L., to University of Dayton. Production of high performance optical spatial filters. 4,516,833, Cl. 350-162.120.

Fushimoto, Hideo; Toyomura, Shigeru; Nishimuro, Yoshiaki; Asakura, Osamu; and Rachi, Masahiro, to Canon Kabushiki Kaisha. Foldable electronic apparatus. 4,517,660, Cl. 364-708.000.

Fussner, Paul; Hofmann, Karl; Komaroff, Iwan; Itoh, Katsuoki; Seifert, Kurt; Trachte, Dietrich; Vogel, Wilhelm; and Vogtmann, Hans-Jorg, to Robert Bosch GmbH. Fuel injection nozzle for internal combustion engines. 4,516,729, Cl. 239-453.000.

Fussner, Paul, to Robert Bosch GmbH. Fuel injection nozzle for internal combustion engines. 4,516,730, Cl. 239-533.800.

G & W Electric Company: *See*—
Fox, James W.; and Hill, Robert J., 4,517,407, Cl. 174-73.00R.

Gach, Paul. Coolant supply apparatus for a grinding tool. 4,516,357, Cl. 51-98.00R.

GAF Corporation: *See*—
Barabas, Eugene S., 4,517,023, Cl. 134-4.000.

Gagner, Michael J.: *See*—
Donahue, John M.; and Gagner, Michael J., 4,516,655, Cl. 180-321.000.

Gaillard, Adrianus J. C.; and Anderson, Richard N., to Hunter Douglas International N.V. Apparatus and a method for assembling slats of a venetian blind. 4,516,300, Cl. 29-24.500.

Gaitten, Dorothy A., executrix: *See*—
Gaitten, Walden M., deceased, 4,516,613, Cl. 144-208.00E.

Gaitten, Walden M., deceased (by Gaitten, Dorothy A., executrix), to Kockums Cancar, Corp. Debarking machine with infeed rolls having helical offset log feeder blades. 4,516,613, Cl. 144-208.00E.

Gallagher, Neal C.: *See*—
Sweeney, Donald W.; Gallagher, Neal C.; and Christensen, Charles R., 4,516,743, Cl. 244-3.130.

Gallaro, Carmelo. Exercise device. 4,516,768, Cl. 272-65.000.

Galle, Kevin; Orimo, Ryoichi; Sakurada, Masahiko; Banno, Taiichi; and Manabe, Sugio, to Olympus Optical Company Limited. Automatic analyzing apparatus. 4,517,160, Cl. 422-65.000.

Gama, Yasuo: *See*—
Suzuki, Hiroshi; Gama, Yasuo; and Miyazaki, Shoji, 4,517,110, Cl. 252-180.000.

Gambro Engstrom AB: *See*—
Gedeon, Andras, 4,516,573, Cl. 128-201.130.

Game Time, Inc.: *See*—
Sutton, Wesley D., Jr., 4,516,766, Cl. 272-52.000.

Gander, Terence W.; and Widden, Charles G. Storage apparatus. 4,516,812, Cl. 312-12.000.

Ganser, Volker: *See*—
Barth, Hubert; Fritschi, Edgar; Ganser, Volker; Hartenstein, Johannes; Herrmann, Manfred; and Satzinger, Gerhard, 4,517,185, Cl. 514-232.000.

Garcia, Leonard M., to Cordis Corporation. Suture collar. 4,516,584, Cl. 128-785.000.

Gardner, Bruce C.; Ingold, Daniel L.; and May, David A., to Appropriate Technology Corporation. Edge seal and rerailer for insulating shade. 4,516,618, Cl. 160-120.000.

Gardner, Donald E.: *See*—
Kaufman, Jack W.; and Gardner, Donald E., 4,516,970, Cl. 604-270.000.

Gardner, Hugh C.; Michno, Michael J., Jr.; and Brode, George L., to Union Carbide Corporation. Preimpregnated reinforcements and high strength composites therefrom. 4,517,321, Cl. 523-400.000.

Garganese, Ugo S.: *See*—
Martin, Raymond H.; Garganese, Ugo S.; and Griffin, John R., 4,517,043, Cl. 156-196.000.

Garneau, Richard P., to AFA Corporation, The. Child-resistant liquid dispenser sprayer or like apparatus. 4,516,695, Cl. 222-153.000.

Garwood, William E.: *See*—
Chester, Arthur W.; Garwood, William E.; and Schwartz, Albert B., 4,517,399, Cl. 585-533.000.

Gasiot, Jean; Braunlich, Peter F.; and Fillard, Jean-Pierre. Method and apparatus for real-time radiation imaging. 4,517,463, Cl. 250-327.200.

Gaston, Roy T. Sanitary drinking water system. 4,516,693, Cl. 222-105.000.

Gaule, Gerhart K.; Yarwood, John C.; and Tyler, Derek E., to Olin Corporation. Multi-turn coils of controlled pitch for electromagnetic casting. 4,516,627, Cl. 164-467.000.

Gault, Roger B.; and Keutzer, Larry L., to VEECO/ai, Inc. Ion implantation control system. 4,517,465, Cl. 250-492.200.

Gauthier, Michel: *See*—
Belanger, Andre ; Pauteux, Denis; and Gauthier, Michel, 4,517,265, Cl. 429-217.000.

Gavlak, Andrea H.: *See*—
Strobel, Gary A.; Gavlak, Andrea H.; and Jaynes, Jesse M., 4,517,008, Cl. 71-77.000.

Gay, Robert R.: *See*—
Morel, Don L.; Gay, Robert R.; and Turner, Gary B., 4,517,403, Cl. 136-249.000.

Gazdik, Charles E.; and McBride, Donald G., to International Business Machines Corporation. Multi-layer flexible film module. 4,517,051, Cl. 156-644.000.
Gazzarrini, Vinicio, to Solis S.r.l. Method and apparatus for applying a patch to manufactured goods. 4,516,513, Cl. 112-262.200.
GCA Corporation: *See*—
Slottag, Mark J., 4,517,430, Cl. 219-10.55B.
Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H.: *See*—
Klimeck, Hugo; and Wilken, Gerhard, 4,516,809, Cl. 299-43.000.
Gedeon, Andras, to Gambro Engstrom AB. Device for connecting a respirator or anesthesia machine to a patient. 4,516,573, Cl. 128-201.130.
Geffroy, Christophe: *See*—
Geffroy, Robert; and Geffroy, Christophe, 4,516,481, Cl. 92-212.000.
Geffroy, Robert; and Geffroy, Christophe. Piston and piston rings set. 4,516,481, Cl. 92-212.000.
Gelbwachs, Jerry A., to United States of America, Air Force. Multiple site laser excited pollution monitoring system. 4,516,858, Cl. 356-437.000.
Genentech, Inc.: *See*—
Bock, Susan C.; and Lawn, Richard M., 4,517,294, Cl. 435-70.000.
General Battery Corporation: *See*—
Beidler, David B., 4,517,262, Cl. 429-87.000.
General Electric Company: *See*—
Aliberto, Anthony C.; and Silberberg, Joseph, 4,517,339, Cl. 525-85.000.
Dembowski, Peter V.; and Dobras, Quentin D., 4,517,493, Cl. 315-73.000.
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.
Kelley, Fred W., Jr., 4,517,635, Cl. 363-136.000.
Kim, Wontaik; and Azad, Farzin H., 4,516,864, Cl. 374-130.000.
Laskaris, Evangelos T., 4,516,404, Cl. 62-45.000.
Laskaris, Evangelos T., 4,516,405, Cl. 62-55.000.
Lockhart, Thomas P.; and Wengrovius, Jeffrey H., 4,517,337, Cl. 524-859.000.
Otto, Lee W.; Ingold, John H.; and Bergman, Rolf S., 4,517,491, Cl. 313-579.000.
Redington, Rowland W., 4,516,582, Cl. 128-653.000.
Ryang, Hong-Son, 4,517,342, Cl. 525-431.000.
Ulug, Mehmet E., 4,517,670, Cl. 370-85.000.
White, Dwain M., 4,517,341, Cl. 525-152.000.
White, Mary A.; Beers, Melvin D.; Lucas, Gary M.; Smith, Robert A.; and Swiger, Roger T., 4,517,352, Cl. 528-18.000.
General Foods Corporation: *See*—
Fogel, Harvey P., 4,517,210, Cl. 426-392.000.
Shoaf, Myron D.; and Pischke, La Monte D., 4,517,214, Cl. 426-548.000.
General Motors Corporation: *See*—
Chyz, George W.; and McGregor, David J., 4,516,957, Cl. 464-111.000.
Jackson, John S., 4,516,401, Cl. 60-602.000.
Kisner, Howard D., 4,517,070, Cl. 204-298.000.
Steele, Robert E., 4,516,828, Cl. 350-96.160.
Gentry, Frank: *See*—
Gentry, Samuel H.; and Gentry, Frank, 4,516,406, Cl. 62-183.000.
Gentry and Green Enterprises: *See*—
Gentry, Samuel H.; and Gentry, Frank, 4,516,406, Cl. 62-183.000.
Gentry, Samuel H.; and Gentry, Frank, to Gentry and Green Enterprises. Cooling system for motor vehicles. 4,516,406, Cl. 62-183.000.
Georgia Tech Research Corporation: *See*—
Tedder, Daniel W., 4,517,298, Cl. 435-160.000.
Gerber, James E.: *See*—
Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., 4,516,659, Cl. 181-243.000.
Gerhard, Gregory J.; and Graham, William M., to CooperVision, Inc. Surgical scalpel. 4,516,575, Cl. 128-305.000.
Gerharz, Reinhold, to United States of America, Army. Passive retroreflective doppler shift system. 4,517,569, Cl. 343-18.00D.
Germania Dairy Automation, Inc.: *See*—
Reingies, Rolf W.; and Camren, Robert, 4,516,530, Cl. 119-14.080.
Gersbach, Klaus: *See*—
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Hemphill, Charles W., 4,516,339, Cl. 37-141.00R.
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Felger, Carl B., 4,517,176, Cl. 424-47.000.
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Hippely, Keith A.; and Goldstein, Samuel M., 4,516,953, Cl. 446-444.000.
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Benko, David A., 4,517,066, Cl. 204-192.00C.
Palmer, Kenneth J.; Brandyberry, Dennis R.; and Rye, Grover W., 4,516,395, Cl. 57-237.000.
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Goto, Hideo; Hosoe, Takeo; Oda, Toshinori; and Ohtsuka, Sosuke, to Brother Kogyo Kabushiki Kaisha. Colored character printed on key button. 4,516,978, Cl. 8-510.000.
Goto, Tomomichi; Iwamoto, Katsuo; Kobayashi, Yoshinori; and Matoba, Isao, to Kawasaki Steel Corporation. Method of producing grain-oriented silicon steel sheets having excellent magnetic properties. 4,517,032, Cl. 148-111.000.
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Graf, Matthew C.; Muhlfeld, Hans P., Jr.; and Valentine, Edward H., to International Business Machines Corporation. Programmable chip tester having plural pin unit buffers which each store sufficient test data for independent operations by each pin unit. 4,517,661, Cl. 364-900.000.

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Grayek, Rose M. Knock-down combination handbag and mat and method of making same. 4,516,668, Cl. 190-2.000.

Green, Michael J.: *See—*
Kreutner, William; Green, Michael J.; Shue, Ho-Jane; and Saksena, Anil K., 4,517,200, Cl. 514-455.000.

Greene, Carmine M., to Miles Laboratorics, Inc. Ketone control test composition, method and test device. 4,517,301, Cl. 436-14.000.

Greenlaw, Alfred L. Ejector and method for controlling jet engine noise. 4,516,660, Cl. 181-296.000.

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Grutsch, George A. Concrete formwork. 4,516,372, Cl. 52-309.120.

GTE Communication Systems Corp.: *See—*
Boeckmann, Eduard F. B., 4,517,414, Cl. 179-81.00R.
Kosten, Richard B., 4,517,419, Cl. 179-159.000.

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Alexander, Kenneth E.; and Marshall, Robert J., 4,517,629, Cl. 362-267.000.
Coad, Brian C., 4,516,716, Cl. 228-263.150.
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Gulick, William D., to S&A Corporation. Wedge device for a pleasure boat cockpit. 4,516,519, Cl. 114-270.000.

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Guyot, Lucien: *See—*
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Guzowski, Raymond J., to Pyles Division. Hot melt anti-surge dispensing system. 4,516,700, Cl. 222-330.000.

H. Stoll GmbH & Co.: *See—*
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Haacke, Harri; and Loch, Karl, to Mannesmann Aktiengesellschaft. Method for testing the total length of extended round material such as pipes and bars, and device to carry out the method. 4,516,429, Cl. 73-638.000.

Haacon hebetechnik GmbH: *See—*
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Haas, Roland: *See—*
Brandenstein, Manfred; Haas, Roland; Edelmann, Ludwig; and Hans, Rudiger, 4,516,962, Cl. 474-112.000.

Habicht, Ernst; and Zbinden, Paul, to Ciba-Geigy Corporation. Benzodioxole derivatives. 4,517,184, Cl. 514-212.000.

Hagman, Harry C. Hosiery donning aid. 4,516,704, Cl. 223-111.000.

Hajek, Bedrich, to Electrostatic Equipment Corp. Electrostatic powder coating control apparatus and method. 4,517,219, Cl. 427-8.000.

Halcon SD Group, Inc., The: *See—*
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Hall, Arthur, to Alpine Plastics Machinery Limited. Bag forming machines of the top stacking type with stack clamp. 4,516,895, Cl. 414-43.000.

Hall, Arthur B., to TP Laboratories, Inc. Bondable lingual retainer. 4,516,938, Cl. 433-215.000.

Hall, James R.; Harter, Donald P.; Clegg, Michael W.; and Gerber, James E., to APX Group, Inc. Replacement muffler and process for making same. 4,516,659, Cl. 181-243.000.

Halmi, Dezsoe, to D. Halmi And Associates Inc. Flow metering device with low energy loss. 4,516,434, Cl. 73-861.640.

Halmos, George T., to Delta Engineering Ltd. Sheet metal joint, structure utilizing the same, and method of construction. 4,516,370, Cl. 52-245.000.

Halsall, James R.; and Murray, Robert T., to Imperial Chemical Industries PLC. Color multiplexing passive sensor array. 4,517,456, Cl. 250-226.000.

Halstead, Raymond T.: *See—*
Black, Charles E., III; and Halstead, Raymond T., 4,517,422, Cl. 200-50.00C.

Hamada, Nobuhiro; Sugimoto, Norihiko; and Nawa, Masumi, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Symmetry type loop communication system. 4,517,644, Cl. 364-200.000.

Hamano, Hideo; and Koga, Yasunori, to Toyota Jidosha Kogyo Kabushiki Kaisha. Restriction device for differential gear. 4,516,443, Cl. 74-711.000.

Hamer, R. Richard L.: *See—*
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Hamilton, Thomas J.: *See—*
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Hammarlund, Kenneth; and Hammarlund, Wilford, 4,516,639, Cl. 172-99.000.

Hampel, Lawrence E.; and Freese, Edward O., to Moline Corporation. Slide adjustment member for a vehicle towbar. 4,516,790, Cl. 280-502.000.

Hampson, Jack T., to J & P Coats, Limited. Loop hold-down device for use in conjunction with a knitting machine. 4,516,411, Cl. 66-64.000.

Hanada, Tsuneo: *See*—
Mine, Katsutoshi; Suzuki, Toshio; and Hanada, Tsuneo, 4,517,238, Cl. 428-212.000.

Hancock, Drew S.: *See*—
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Hann, William M.; DuPre, Jean; and Natoli, John, to Rohm and Haas Company. Method of dispersing inorganic materials in aqueous systems with low molecular weight acrylic acid copolymers. 4,517,098, Cl. 210-701.000.

Hans, Rudiger: *See*—
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Hanson, Raymond: *See*—
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Harada, Atsumu; and Arikawa, Tetsuro, to Nippon Air Brake Co., Ltd. Memory system of wheel speed of vehicle with skid control system. 4,517,647, Cl. 364-426.000.

Haraldsson, Roland; Bengtsson, Jan; and Friberg, Claes, to Fjalkinge Potato Processing Machinery AB. Method for the production of concentrated, frozen potato puree. 4,517,211, Cl. 426-444.000.

Harao, Norio: *See*—
Sugimori, Fumio; Nishino, Chikae; and Harao, Norio, 4,516,715, Cl. 228-208.000.

Harashima, Asao; Nakamura, Takashi; and Kishimoto, Keiichi, to Toray Silicone Company, Ltd. Method for manufacturing reactive injection-molded products. 4,517,150, Cl. 264-300.000.

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Thone, Heinrich; Hargassner, Reinhard; Deibl, Gottfried; and Holleis, Gunter, 4,516,622, Cl. 164-416.000.

Harigaya, Isamu: *See*—
Akiyama, Yoshinori; Nishimura, Shinichi; and Harigaya, Isamu, 4,516,811, Cl. 308-3.00R.

Harland, Gary D.; and Brownell, Dean B., to Sprague Electric Company. Method for cutting and separating green ceramic capacitor bodies. 4,517,144, Cl. 264-28.000.

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Harney, Marilyn J.; Vauss, Elvin M., Jr.; and Sane, Ajit Y., to Eltech Systems Corporation. Titanium and titanium hydride reticulates and method for making. 4,517,069, Cl. 204-290.00F.

Harris, Gerald R.: *See*—
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Harrison, Lynn: *See*—
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Harsco Corporation: *See*—
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Hart, Terance W.: *See*—
Bird, Clive W.; Butler, Helene I.; Caton, Michael P. L.; Coffee, Edward C. J.; Darnbrough, Geoffrey; and Hart, Terance W., 4,517,202, Cl. 514-530.000.

Hartenstein, Johannes: *See*—
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Harter, Donald P.: *See*—
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Hartley, Doug: *See*—
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Hartmann, Eduard, to Bucher-Guyer AG. Press drainage. 4,516,490, Cl. 100-107.000.

Hartmann, Kurt: *See*—
Bohg, Armin; Matthaei, Horst D.; and Hartmann, Kurt, 4,517,538, Cl. 335-272.000.

Haruta, Masahiro: *See*—
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Harvey, Richard D., to Grain Processing Corporation. Starch production from corn. 4,517,022, Cl. 127-68.000.

Hasbrouck, Anna B., legal representative: *See*—
Hasbrouck, Gene B., deceased, 4,516,619, Cl. 160-135.000.

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Hase, Teizo: *See*—
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Hasegawa, Junzo: *See*—
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Hashimoto, Hiroshi, to Daiwa Seiko Inc. Spool braking device for double-bearing fishing reel. 4,516,741, Cl. 242-217.000.

Hashimoto, Seiji: *See*—
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Haskell, Jacob D., to Advanced Micro Devices, Inc. Method of making improved twin wells for CMOS devices by controlling spatial separation. 4,516,316, Cl. 29-576.00W.

Haskins, Steve W., to Northern Telecom Limited. Integral cup and hookswitch actuator for a telephone set. 4,517,420, Cl. 179-164.000.

Hastings, John H. Valveless trumpet instrument. 4,516,464, Cl. 84-387.00R.

Hata, Akio; and Tanga, Michifumi, to Tokuyama Sekisui Kogyo Kabushiki Kaisha. Process for removing polymer scale adhering to a polymerization vessel. 4,517,350, Cl. 526-344.200.

Hattori, Akira; Hayashi, Hiromu; Shinagawa, Akio; and Shinogi, Tsuyoshi, to Fujitsu Limited. Stack machine with improved cache memory for variables. 4,517,640, Cl. 364-200.000.

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Imanaka, Hiroshi; Miyoshi, Toshio; Konomi, Toshio; Kubochi, Yoshiaki; Hattori, Seiziro; and Kawakita, Takeshi, 4,517,299, Cl. 435-197.000.

Haufe, Paul: *See*—
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Hawk Industries, Inc.: *See*—
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Hayashi, Hiromu: *See*—
Hattori, Akira; Hayashi, Hiromu; Shinagawa, Akio; and Shinogi, Tsuyoshi, 4,517,640, Cl. 364-200.000.

Hayashi, Kazuhiko: *See*—
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Hayashi, Mitsuo: *See*—
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Hayashi, Yoshiki: *See*—
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Hayes, Willliam; and Dohrenwend, James W., to ARC Rebuilders, Inc. Filter device having relief valve for use in power steering system. 4,517,083, Cl. 210-131.000.

Heaney, Richard; and Naslund, Erik I., to Brown & Williamson Tobacco Corporation. Device for making grooves in cigarette filters. 4,517,046, Cl. 156-500.000.

Heaps, John F.; and Erickson, Dennis E., to Monsanto Company. Low temperature curable coating composition. 4,517,327, Cl. 524-315.000.

Heat Exchange and Transfer, Inc.: *See*—
Meyer, Howard E., 4,516,556, Cl. 123-557.000.

Heath, James E.; and Swenson, Hilmer W., to United States of America, Air Force. Sensor system. 4,517,464, Cl. 250-370.000.

Hebenstreit, William E.: *See*—
Yackel, Walter C., Jr.; and Hebenstreit, William E., 4,517,218, Cl. 426-656.000.

Heermann GmbH: *See*—
Meistring, Rolf; Siegling, Hans-Friedrich; and Pfahl, Siegfried, 4,516,831, Cl. 350-96.230.

Hefner, Robert E., Jr., to Dow Chemical Company, The. The high yield process for the cyanoalkylation or amidoalkylation or hydroxyaromatic compounds. 4,517,131, Cl. 260-465.00F.

Heidelberg, Gotz. Vehicle which can be held on a roadway with the aid of an attracting magnetic device. 4,516,505, Cl. 104-284.000.

Heider, Richard M. Insulating block and a wall thereof. 4,516,364, Cl. 52-98.000.

Heininger, Ammon N., Jr.; and Barnik, Edward A., to Black & Decker Inc. Modular housing system for a circular saw. 4,516,324, Cl. 30-377.000.

Heinrich, Wulf-Dieter; and Otte, Henning, to Robert Bosch GmbH. Wrench provided with an alternating current drive motor. 4,517,506, Cl. 318-807.000.

Heinzl, Alfred: *See*—
Weiser, Josef; Heinzl, Alfred; and Stadler, Heinz, 4,517,537, Cl. 335-187.000.

Held, Manfred; and Grossler, Peter, to Messerschmitt-Bolkow-Blohm GmbH. Ammunition construction with selection means for controlling fragmentation size. 4,516,501, Cl. 102-496.000.

Heldenbrand, William C. Pipe testing apparatus. 4,516,431, Cl. 73-826.000.

Hellman, Gosta. Spraying device. 4,516,724, Cl. 239-119.000.

Hemery, Andre, to Allibert S.A. Preparing reinforced impervious articles. 4,517,136, Cl. 264-25.000.

Hemphill, Charles W., to GH Hensley Industries, Inc. Combination excavating bucket, shank and digging teeth. 4,516,339, Cl. 37-141.00R.

Hendrick, Michael E.: *See*—
Brennan, Thomas M.; and Hendrick, Michael E., 4,517,379, Cl. 564-193.000.

Hendrickson, Larry L.: *See*—
Anello, Louis G.; Van Der Puy, Michael; Hendrickson, Larry L.; Rogic, Milorad M.; Swerdloff, Michael D.; and Kolc, Jaroslav F., 4,517,002, Cl. 71-28.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,003, Cl. 71-28.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,005, Cl. 71-28.000.
Swerdloff, Michael D.; Kolc, Jaroslav F.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,004, Cl. 71-28.000.
Swerdloff, Michael D.; Kolc, Jaroslav F.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,007, Cl. 71-28.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Wilk, Hans-Christoph; Wegemund, Bernd; and Gorzinski, Manfred, 4,517,334, Cl. 524-539.000.

Henkes, Dale D.: *See*—
Loch, David M.; and Henkes, Dale D., 4,517,059, Cl. 204-14.100.

Hennenfent, Douglas J.; Holmstrand, Allan L.; and Kracke, Alan G., to Magnetic Peripherals Inc. Method for attaching a workpiece to a workpiece carrier. 4,517,041, Cl. 156-155.000.

Henschenmacher, Helmut: *See*—
Lewis, Edwin C.; Henschenmacher, Helmut; Ecker, Karl-Heinz; Giernalczyk, Hartmut; and Rutte, Siegfried, 4,516,477, Cl. 92-128.000.

Hepher, Nicholas M.: *See*—
Inculet, Ion I.; Norberg, Anna K. E.; and Hepher, Nicholas M., 4,517,078, Cl. 209-127.300.

Herbert, Reinhold, to Fresenius, AG. Storage bag. 4,516,977, Cl. 604-415.000.

Herchenbach, Horst: *See*—
Steinbiss, Eberhard; and Herchenbach, Horst, 4,517,020, Cl. 106-100.000.

Herr, Charles H., Jr., to Caterpillar Tractor Co. High-low braked gear drive. 4,516,444, Cl. 74-781.00R.

Herrmann, Manfred: *See*—
Barth, Hubert; Fritschi, Edgar; Ganser, Volker; Hartenstein, Johannes; Herrmann, Manfred; and Satzinger, Gerhard, 4,517,185, Cl. 514-232.000.

Herter, Carl J. Method for preparing a low residual alloy steel charge from scrap metal. 4,517,016, Cl. 75-28.000.

Hess, Susan V.: *See*—
Plante, Stuart E.; and Hess, Susan V., 4,517,025, Cl. 134-38.000.

Hesse, Myron C. Fine-droplets sprayer system for terrain vehicular use. 4,516,723, Cl. 239-77.000.

Hesston Corporation: *See*—
Hill, Amos G., 4,516,903, Cl. 414-491.000.

Hetherington, Robert D.: *See*—
Cavanaugh, James E.; Hetherington, Robert D.; and Parmley, Thomas A., 4,516,725, Cl. 239-127.000.

Hettiger, James: *See*—
Murphy, Wesley W., III; and Hettiger, James, 4,517,602, Cl. 358-198.000.

Hewes, Francis W., Jr. Tool for castrating animals by severing the spermatic cord by searing or cauterization. 4,516,574, Cl. 128-303.100.

Heymer, Gero: *See*—
Jodden, Klaus; Heymer, Gero; and Stephan, Hans-Werner, 4,517,163, Cl. 423-75.000.

Hibi, Tsuneo: *See*—
Yamauchi, Toshiaki; Hibi, Tsuneo; Sasano, Kiyomi; and Hayashi, Yoshiki, 4,516,331, Cl. 34-77.000.

Hicks, John E.; and Kubat, James J., to Outboard Marine Corporation. Soil aerating apparatus with hydraulic valve arrangement. 4,516,638, Cl. 172-22.000.

Hicks, Kevin J. Food processing apparatus. 4,517,447, Cl. 219-388.000.

Hidden Valley Associates, Inc.: *See*—
Phillips, Edward H., 4,516,958, Cl. 464-153.000.

Hideo, Sugimori. Resistance thermometer. 4,516,865, Cl. 374-172.000.

Hierholzer, Melvin C. Highlighting applicator. 4,516,591, Cl. 132-88.700.

Highby, Dennis N., to Cabela's Inc. Casting rod and handle assembly. 4,516,351, Cl. 43-23.000.

Higuchi, Megumu: *See*—
Morikawa, Kunihiko; Higuchi, Megumu; and Yanai, Tokiyoshi, 4,516,422, Cl. 72-377.000.

Hill, Amos G., to Hesston Corporation. Elevator position-control mechanism for rotatable forage container. 4,516,903, Cl. 414-491.000.

Hill, Elmer D.: *See*—
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.

Hill, Howard D.; and Zens, Albert P., to Varian Associates, Inc. NMR Probe coil form structure. 4,517,516, Cl. 324-318.000.

Hill, Robert J.: *See*—
Fox, James W.; and Hill, Robert J., 4,517,407, Cl. 174-73.00R.

Hill, Ronald C.; Stein, Richard M.; Bzibziak, Raymond J.; and Goodwill, Robert, to Houdaille Industries, Inc. Punch and ram assembly for punch press. 4,516,448, Cl. 83-137.000.

Hill, William D.: *See*—
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.

Himmele, Walter: *See*—
Becker, Rainer; Jahn, Dieter; Keil, Michael; Himmele, Walter; and Wuerzer, Bruno, 4,517,013, Cl. 71-98.000.

Himukashi, Yoshinori: *See*—
Kawahito, Takashi; Himukashi, Yoshinori; and Yamada, Tetsuo, 4,517,168, Cl. 423-344.000.

Hinden, Jean M.; Ernes, Lynne M.; and Visel, Patrick E., to Eltech Systems Corporation. Electrocatalytic electrode. 4,517,068, Cl. 204-283.000.

Hino, Hiromasa, to Fuji Photo Film Co., Ltd. Recording error-prevention system. 4,516,846, Cl. 354-465.000.

Hino, Hiromasa, to Fuji Photo Film Co., Ltd. Rotary head for magnetic tape record and playback. 4,517,615, Cl. 360-108.000.

Hippely, Keith A.; and Goldstein, Samuel M., to Mattel, Inc. Toy vehicular playset. 4,516,953, Cl. 446-444.000.

Hirai, Masahide: *See*—
Sekine, Kunio; Masuda, Hitoshi; Ishibashi, Kodo; Hirai, Masahide; Tomoshige, Shozo; and Kondo, Kozo, 4,517,096, Cl. 210-668.000.

Hirasako, Akio: *See*—
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Hiratsuka, Shigetoshi: *See*—
Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, 4,517,444, Cl. 219-216.000.

Hirobumi, Saito; Kiyoshi, Ito; Kaichi, Higuchi; and Masao, Yamamoto, to Mitsubishi Denki Kabushiki Kaisha. Expansion type life-saving raft. 4,516,944, Cl. 441-40.000.

Hiroi, Kazuo; and Kojima, Kenji, to Kabushiki Kaisha Toshiba. Method for controlling oxygen density in combustion exhaust gas. 4,516,929, Cl. 431-12.000.

Hironaga, Katsuji; and Nishiura, Tadaki, to Nihon Kagaku Kogyo Co., Ltd. Apparatus for measuring two-phase flow. 4,516,432, Cl. 73-861.040.

Hirooka, Masaaki; Kubo, Keiji; and Yoshihara, Toshiyuki, to Canon Kabushiki Kaisha. Electrophotographic CdS photosensitive member with acrylic resin binder. 4,517,271, Cl. 430-94.000.

Hirose, Haruomi; and Yamazaki, Akio, to Daiwa Seiko Co., Ltd. Trawling line information communication system. 4,516,348, Cl. 43-17.000.

Hirota, Tatsuya: *See*—
Aoki, Yoshiaki; Suzuki, Hazime; and Hirota, Tatsuya, 4,516,335, Cl. 34-133.000.

Hisamoto, Iwao; Omure, Yukio; and Ishikawa, Sueyoshi, to Daikin Kogyo Co., Ltd. Cleaning composition. 4,517,108, Cl. 252-162.000.

Hitachi Chemical Company, Ltd.: *See*—
Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, 4,517,282, Cl. 430-399.000.

Hitachi Engineering Co., Ltd.: *See*—
Hamada, Nobuhiro; Sugimoto, Norihiko; and Nawa, Masumi, 4,517,644, Cl. 364-200.000.

Hitachi, Ltd.: *See*—
Aizawa, Iwao; and Masuda, Michio, 4,517,587, Cl. 358-17.000.
Hamada, Nobuhiro; Sugimoto, Norihiko; and Nawa, Masumi, 4,517,644, Cl. 364-200.000.
Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, 4,517,444, Cl. 219-216.000.
Matsushita, Yasuo; Nakamura, Kousuke; and Ura, Mitsuru, 4,517,584, Cl. 357-80.000.
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, 4,517,087, Cl. 210-396.000.
Sone, Masazumi; Imai, Iwao; and Nagae, Hiromitsu, 4,516,319, Cl. 29-877.000.
Takahashi, Hideo; and Nakatani, Mitsuo, 4,517,490, Cl. 313-502.000.
Tsuchihashi, Akira; and Teramoto, Kazuyoshi, 4,517,653, Cl. 364-513.000.

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Spain, Raymond G., 4,517,245, Cl. 428-367.000.

Hiyama, Takashi: *See*—
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, 4,517,180, Cl. 514-16.000.

Ho, Chu-Ngi: *See*—
Warner, Isiah M.; and Ho, Chu-Ngi, 4,516,984, Cl. 55-16.000.

Hobbs, Andrew G. P., Jr.; Lickle, Brett D.; and Hobbs, Patricia W. Portable beverage cooler. 4,516,409, Cl. 62-457.000.

Hobbs, Patricia W.: *See*—
Hobbs, Andrew G. P., Jr.; Lickle, Brett D.; and Hobbs, Patricia W., 4,516,409, Cl. 62-457.000.

Hodge, Allan M. Standardized sampling hay probe. 4,516,438, Cl. 73-864.440.

Hodges, Donald R.; and Sherwood, William G., to AMAX Inc. Method for electroforming metal slugs and reusable integrated cathode unit. 4,517,058, Cl. 204-4.000.

Hoechst Aktiengesellschaft: *See*—
Jodden, Klaus; Heymer, Gero; and Stephan, Hans-Werner, 4,517,163, Cl. 423-75.000.
Leistner, Gerhard; Muller, Gerhard; Sell, Gunther; and Bauer, Alexander, 4,517,093, Cl. 210-629.000.
Merkenich, Karl; Wasel-Nielen, Horst-Dieter; Maurer, Alexander; and Adrian, Renate, 4,517,109, Cl. 252-135.000.
Reske, Eckart; and Wolters, Ernst, 4,517,319, Cl. 523-200.000.
Stahlhofen, Paul, 4,517,275, Cl. 430-165.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See—*
Effland, Richard C.; Klein, Joseph T.; and Hamer, R. Richard L., 4,517,195, Cl. 514-413.000.
Glamkowski, Edward J.; Jones, Michael C., deceased; and Jones, Herbert, administrator, 4,517,311, Cl. 514-462.000.
Hoek, Arend; and Kieffer, Eduard P., to Shell Oil Company. Process for the preparation of middle distillates. 4,517,396, Cl. 585-415.000.
Hoel, Olav: *See—*
Grimhall, Carl G.; and Hoel, Olav, 4,516,614, Cl. 144-364.000.
Hoesch Werke Aktiengesellschaft: *See—*
Bartzick, Gunter; Buhne, Gerd; and Naydowski, Reinhard, 4,516,488, Cl. 100-4.000.
Hofbauer, August; and Exinger, Erich, to Dr. Ing. h.c.F. Porsche AG. Air quality measuring device for a fuel injection installation. 4,516,552, Cl. 123-452.000.
Hoffman, David M.; Feher, John J.; and Farmer, Homer H., to R. T. Vanderbilt Company, Inc. Lubricating compositions containing 5,5'-dithiobis(1,3,4-thiadiazole-2-thiol). 4,517,103, Cl. 252-28.000.
Hoffman, Richard A., to Westinghouse Electric Corp. Protective coating means for articles such as gold-plated jewelry and wristwatch components. 4,517,217, Cl. 428-632.000.
Hoffmann, Gerhard: *See—*
Graser, Fritz; Hoffmann, Gerhard; Leyrer, Reinhold J.; Neumann, Peter; and Patsch, Manfred, 4,517,270, Cl. 430-58.000.
Hoffmann-La Roche Inc.: *See—*
Felix, Arthur M.; Gillessen, Dieter; Lergier, William; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,517,119, Cl. 260-112.50R.
Muller, Bernard; Piat, Rene ; Rensing, Cornelis; and Trajin, Jean-Paul, 4,517,362, Cl. 546-7.000.
Hoffmann, Werner: *See—*
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Hofmann, Karl: *See—*
Fussner, Paul; Hofmann, Karl; Komaroff, Iwan; Itoh, Katsuoki; Seifert, Kurt; Trachte, Dietrich; Vogel, Wilhelm; and Vogtmann, Hans-Jorg, 4,516,729, Cl. 239-453.000.
Hoie, Karl H. Mixing and spraying apparatus for liquids, optionally for powder and liquid. 4,516,726, Cl. 239-317.000.
Holl, Roland, to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft. Arrangement in printing machines having a varnishing unit for varnishing printed sheets. 4,517,221, Cl. 427-8.000.
Holleis, Gunter: *See—*
Thone, Heinrich; Hargassner, Reinhard; Deibl, Gottfried; and Holleis, Gunter, 4,516,622, Cl. 164-416.000.
Hollenbeck, Dennis W.: *See—*
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.
Holler, Heinz; and Weber, Wolfgang, to Voith Turbo GmbH & Co. KG. Hydraulic coupling. 4,516,399, Cl. 60-351.000.
Holmstrand, Allan L.: *See—*
Hennenfent, Douglas J.; Holmstrand, Allan L.; and Kracke, Alan G., 4,517,041, Cl. 156-155.000.
Hon Industries, Inc.: *See—*
Hasbrouck, Gene B., deceased, 4,516,619, Cl. 160-135.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Arakawa, Tetsuo; and Nagahiro, Kenichi, 4,516,538, Cl. 123-52.00M.
Miura, Nobuo; and Ishii, Nolihisa, 4,516,554, Cl. 123-418.000.
Murayama, Masato, 4,517,417, Cl. 179-156.00R.
Nakamura, Yukinobu; Tagami, Katsutoshi; and Takahashi, Tsuneo, 4,517,565, Cl. 340-995.000.
Nishikawa, Masao; Aoki, Takashi; Sakai, Shinzo; and Yoshizawa, Hiroshi, 4,516,671, Cl. 192-.076.
Shioya, Toshio; and Kimura, Katsuhiko, 4,516,555, Cl. 123-470.000.
Yamaguchi, Ken, 4,516,630, Cl. 165-47.000.
Honda, Nobuyasu; Yamakawa, Toshiro; and Ikeda, Toshimitsu, to Mita Industrial Co., Ltd. Method for developing electrostatic latent images. 4,517,274, Cl. 430-122.000.
Honeywell Information Systems Inc.: *See—*
Mantellina, Calogero; and Zanzottera, Daniele, 4,517,681, Cl. 375-106.000.
Hong, Chi-Shain: *See—*
Liu, Yet-Zen; and Hong, Chi-Shain, 4,517,674, Cl. 372-45.000.
Honji, Kunihiko; and Aoki, Toshiyuki, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Apparatus for sensing and memorizing model profile and for controlling machining operation thereby. 4,517,504, Cl. 318-568.000.
Honjo, Norifumi: *See—*
Nakahara, Mitsuharu; Ishida, Tomio; Honjo, Norifumi; and Yoshida, Yoshitaka, 4,516,537, Cl. 123-48.0AA.
Hoshu Chemical Ind. Co. Ltd.: *See—*
Matsunaga, Fujihisa; Nishimura, Tadahiko; Miyake, Etsuo; and Banba, Kiyotaka, 4,517,387, Cl. 568-728.000.
Hooper Trading Co. N.V.: *See—*
Fabricius, Hans-Åke; and Stahn, Roland, 4,517,293, Cl. 435-68.000.
Hoover Universal, Inc.: *See—*
Cavin, J. N.; and Frees, Kenneth A., 4,516,905, Cl. 414-620.000.
Hopkins, Ronald J.; Thomas, Evan G.; and Kieta, Harold J., to Allied Corporation. Soluble surfactant additives for ammonium fluoride/hydrofluoric acid oxide etchant solutions. 4,517,106, Cl. 252-79.400.
Hoppe, Lutz: *See—*
Luhmann, Erhard; Hoppe, Lutz; Szablikowski, Klaus; and Lampert, Friedrich-Karl, 4,517,324, Cl. 524-27.000.
Hoppner, Bernd: *See—*
Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 568-885.000.
Horbaschek, Heinz, to Siemens Aktiengesellschaft. X-Ray diagnostic installation. 4,517,594, Cl. 358-111.000.
Horikoshi, Shigeo: *See—*
Kumasaka, Sadao; Tada, Satomi; Horikoshi, Shigeo; Kamanaka, Tamaki; and Taniguchi, Hiroshi, 4,517,312, Cl. 521-47.000.
Horinouchi, Atsushi, to Sanyo Electric Co., Ltd. Electronic controlled heat cooking apparatus and method of controlling thereof. 4,517,429, Cl. 219-10.55B.
Hoshi, Shoichi: *See—*
Terauchi, Takashi; Sato, Koji; and Hoshi, Shoichi, 4,517,397, Cl. 585-428.000.
Hosoe, Takeo: *See—*
Goto, Hideo; Hosoe, Takeo; Oda, Toshinori; and Ohtsuka, Sosuke, 4,516,978, Cl. 8-510.000.
Hosokawa-Nauta B.V.: *See—*
van der Laan, Jan G. J.; and Entrop, Willem, 4,516,860, Cl. 366-287.000.
Houdaille Industries, Inc.: *See—*
Hill, Ronald C.; Stein, Richard M.; Bzibziak, Raymond J.; and Goodwill, Robert, 4,516,448, Cl. 83-137.000.
Hougen Manufacturing, Inc.: *See—*
Beharry, Michael, 4,516,890, Cl. 408-204.000.
House Food Industrial Company, Ltd.: *See—*
Sugisawa, Ko; Sekiguchi, Kazuya; Taguchi, Masao; Nakatani, Masayuki; and Iwata, Hitoshi, 4,516,596, Cl. 137-240.000.
Howell, Edward B., to Design Professionals Financial Corporation. Vibration transducer with dual opposed magnetic assemblies and counterbalanced mass. 4,517,514, Cl. 324-207.000.
Hradek, Jaroslav: *See—*
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Hsu, Jau Y., to Nestec, S.A. Preparation of vegetable pastas. 4,517,215, Cl. 426-557.000.
Huang, I-Der: *See—*
Yang, Tai-Cheng; Rao, Krishna K.; and Huang, I-Der, 4,517,371, Cl. 549-239.000.
Huber, Reinhold; and Koster, Waldemar, to Kober AG. Bridging arrangement for expansion joints in the carriageways of bridges or the like. 4,516,284, Cl. 14-16.500.
Hubler, Lawrence C.: *See—*
Braun, Oskar J.; and Hubler, Lawrence C., 4,516,714, Cl. 227-78.000.
Hucker, David J.; and Straznickas, Donald A., to Sundstrand Corporation. Permanent magnet rotor with saturable flux bridges. 4,517,483, Cl. 310-156.000.
Hudgens, Stephen J.: *See—*
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., 4,517,223, Cl. 427-39.000.
Hudson Oxygen Therapy Sales Company: *See—*
Rowland, Robert O., 4,516,424, Cl. 73-23.000.
Hudson, Steven L., to Estate of Thomas S. Krause, The. Fluid coupling. 4,516,796, Cl. 285-321.000.
Hugh, Steven C., to Boeing Company, The. Pre-alloyed thick film conductor for use with aluminum wire bonding and method of bonding. 4,517,252, Cl. 428-553.000.
Hughes Aircraft Company: *See—*
Mulliner, Richard R.; and Rocke, Richard D., 4,517,571, Cl. 343-771.000.
Zwirn, Robert; Dragavon, Edward J.; and Smithgall, Brian, 4,517,599, Cl. 358-166.000.
Hughes, Garyth: *See—*
Dickerdike, Robert L.; and Hughes, Garyth, 4,517,027, Cl. 148-6.300.
Hughes Tool Company-USA: *See—*
Burr, Bruce H., 4,516,641, Cl. 175-228.000.
Hughes, William E.; Dare, Keith E.; and Cooper, Jerry W., to Dayco Corporation. Multiple fluid conveying hose assembly and method of making same. 4,517,404, Cl. 174-47.000.
Huhn, Erhard: *See—*
Ludenbach, Karl; and Huhn, Erhard, 4,516,602, Cl. 137-512.150.
Hujala, Jorma; and Koponen, Martti, to Valmet OY. Web-forming section of a paper machine intended for modernization of a fourdrinier wire. 4,517,054, Cl. 162-301.000.
Hulsink, Jan H. Orthodontic device. 4,516,936, Cl. 433-6.000.
Hultgren, Karl S. H. Arrangement in combustion chambers for burning solid fuel. 4,516,562, Cl. 126-77.000.
Humble, David R.; and Barth, Hans. Sailboard boom-to-mast connector. 4,516,873, Cl. 403-191.000.
Humblot, Bernard. Electric resistance welding apparatus. 4,517,435, Cl. 219-89.000.
Hunter Douglas International N.V.: *See—*
Gaillard, Adrianus J. C.; and Anderson, Richard N., 4,516,300, Cl. 29-24.500.
Huret et ses Fils: *See—*
Coue, Maurice, 4,517,450, Cl. 235-95.00R.
Coue , Maurice E. L., 4,516,961, Cl. 474-80.000.
Hutchings, David A.: *See—*
Willard, G. Fred; and Hutchings, David A., 4,516,996, Cl. 65-3.430.
Hutchinson: *See—*
Tavin, Gerard, 4,516,421, Cl. 72-354.000.

Hutchison, Wanda S.: *See—*
Lance, Clyde E.; and Hutchison, Wanda S., 4,516,827, Cl. 350-96.150.
Hydraulic Technology Corporation: *See—*
Sheriff, Merle M., 4,516,468, Cl. 91-169.000.
Hydro-Quebec: *See—*
Belanger, Andre ; Fauteux, Denis; and Gauthier, Michel, 4,517,265, Cl. 429-217.000.
Hydrotreat, Inc.: *See—*
Arnaud, Johnny, 4,517,089, Cl. 210-488.000.
Iain, Stewart, to Maschinenfabrik Fr. Niepmann GmbH & Co. Device for the packaging of powder, granulates and lump, pasty and liquid materials to be packaged by means of a tubular film. 4,516,379, Cl. 53-138.00A.
Ideno, Shigeru: *See—*
Nakamura, Kenji; and Ideno, Shigeru, 4,517,550, Cl. 340-347.0CC.
IGT: *See—*
Carmean, Wesley F., 4,517,654, Cl. 364-521.000.
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Iida, Kazuhiko, to Tokyo Shibaura Denki Kabushiki Kaisha. Picture information filing system for permanently storing portions of previously permanently stored data logically combining the portions. 4,517,658, Cl. 364-900.000.
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Ikeda, Tadashi: *See—*
Kanda, Yoshiro; Noguchi, Hironori; and Ikeda, Tadashi, 4,516,327, Cl. 33-169.00R.
Ikeda, Toshimitsu: *See—*
Honda, Nobuyasu; Yamakawa, Toshiro; and Ikeda, Toshimitsu, 4,517,274, Cl. 430-122.000.
Ikegami, Kasumi; and Okuyama, Hirofumi, to Fujitsu Limited. Holographic recording material and process for producing holograms. 4,517,266, Cl. 430-2.000.
Ikehata, Yukio, to Seiko Instruments & Electronics Ltd. Electronic timepiece operable in continuous and stepwise modes. 4,516,863, Cl. 368-157.000.
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Anzai, Nobuo; and Ikejima, Hiroyuki, 4,516,664, Cl. 187-29.00R.
Illinois Tool Works Inc.: *See—*
Barth, Gerald D., 4,516,893, Cl. 411-184.000.
Engstrom, Keith A., 4,517,553, Cl. 340-365.00S.
Imai, Iwao: *See—*
Sone, Masazumi; Imai, Iwao; and Nagae, Hiromitsu, 4,516,319, Cl. 29-877.000.
Imai, Kazuyoshi: *See—*
Matsuyama, Kiyoshi; Ochi, Kenji; Ogawa, Hiroyuki; Suzaki, Takuya; and Imai, Kazuyoshi, 4,517,246, Cl. 428-407.000.
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Takakuwa, Shilo; Kobayashi, Isao; Takahashi, Tastuo; and Imamizu, Shige, 4,516,311, Cl. 29-568.000.
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Taguchi, Haruyoshi; Tsujimura, Hideo; and Imanishi, Masamichi, 4,516,687, Cl. 220-94.00R.
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Imnetec Inc.: *See—*
Davis, Jeffrey J., 4,516,974, Cl. 604-333.000.
Imperial Chemical Industries PLC: *See—*
Halsall, James R.; and Murray, Robert T., 4,517,456, Cl. 250-226.000.
Milner, David J., 4,517,129, Cl. 260-465.00G.
Imperiale, Nino, to W. R. Grace & Co., Cryovac Div. Method and apparatus for opening and loading flexible containers. 4,516,384, Cl. 53-459.000.
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Kokubo, Eiichi; Arikawa, Junichi; Goi, Kowichi; and Imura, Shinichi, 4,517,451, Cl. 235-379.000.
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Inaba, Hideaki; and Sakakibara, Shuzi, to Daido Tokushuko Kabushiki Kaisha. Steel refining method. 4,517,015, Cl. 75-12.000.
Inata, Hiroo: *See—*
Matsumura, Shunichi; and Inata, Hiroo, 4,517,315, Cl. 521-64.000.
Incom International Inc.: *See—*
Paynter, Alan H., 4,516,441, Cl. 74-501.00R.
Inconix Corporation: *See—*
Cassell, Douglas A., 4,517,637, Cl. 364-138.000.
Inculet, Ion I.; Norberg, Anna K. E.; and Hepher, Nicholas M., to Blue Circle Industries PLC. Method and apparatus for separating particulate materials. 4,517,078, Cl. 209-127.300.
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Black, Charles E., III; and Halstead, Raymond T., 4,517,422, Cl. 200-50.00C.
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DeVale, Donald P.; Brejcha, Robert J.; and Van Naarden, Robert W., 4,516,781, Cl. 273-373.000.
Industrial Engraving and Manufacturing Corp.: *See—*
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Ingersoll-Rand Company: *See—*
Chulada, Edmund C.; and Nelson, David A., 4,516,302, Cl. 29-156.80R.
Ingold, Daniel L.: *See—*
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Inland Steel Company: *See—*
Nickola, Richard A.; and Agarwal, Shashi B., 4,517,229, Cl. 427-383.900.
Inmont Corporation: *See—*
Panush, Sol, 4,517,249, Cl. 428-463.000.
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Inoue, Sukejiro; Hasegawa, Tetsuo; and Nishikawa, Yoshihiro, to Canon Kabushiki Kaisha. Pressure fixable capsule toner. 4,517,273, Cl. 430-111.000.
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Kroczynski, Patrice, 4,517,424, Cl. 200-52.00R.
International Business Machines Corporation: *See—*
Bohg, Armin; Matthaei, Horst D.; and Hartmann, Kurt, 4,517,538, Cl. 335-272.000.
Bourgeois, Serge; Carle, Jean-Franqois; Lochon, Henri; and Trotin, Jean-Pierre, 4,516,525, Cl. 118-688.000.
Fotiadis, Emanuel; Kozol, Edward J.; Leung, Tak L.; and Paul, Robert J., 4,516,678, Cl. 206-444.000.
Gazdik, Charles E.; and McBride, Donald G., 4,517,051, Cl. 156-644.000.
Graf, Matthew C.; Muhlfeld, Hans P., Jr.; and Valentine, Edward H., 4,517,661, Cl. 364-900.000.
Jain, Kantilal; and Latta, Milton R., 4,516,832, Cl. 350-96.240.
Korth, Hans E., 4,516,855, Cl. 356-367.000.
Lasher, Dana A.; and Stelzenmuller, William K., 4,517,604, Cl. 358-262.000.
Pinheiro, Edwin J., 4,517,641, Cl. 364-200.000.
International Flavors & Fragrances Inc.: *See—*
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.
Sprecker, Mark A., 4,517,213, Cl. 426-538.000.
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Davids, Robert E., 4,517,358, Cl. 340-700.000.
International Hydron Corporation: *See—*
Rawlings, David L., 4,516,924, Cl. 425-434.000.
Rawlings, David L.; and Glick, Robert E., 4,517,138, Cl. 264-2.100.
Rawlings, David L.; and Glick, Robert E., 4,517,139, Cl. 264-2.100.
Rawlings, David L., 4,517,140, Cl. 264-2.100.
International Telephone & Telegraph Corporation: *See—*
Borsuk, Leslie M.; and Corrales, Patrick G., 4,516,829, Cl. 350-96.200.
Nieman, Gerald R., 4,516,821, Cl. 339-75.00M.
Intevep, S.A.: *See—*
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Inui, Tsuneo: *See—*
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Iowa State University Research Foundation, Inc.: *See—*
Wheelock, Thomas D., 4,516,980, Cl. 44-1.0SR.
Ireland, Hugh C., to Simplex-GE Limited. Coupling device. 4,516,814, Cl. 339-7.000.
Irgel, Lutz: *See—*
Ehlenz, Peter; and Irgel, Lutz, 4,517,308, Cl. 502-401.000.
Irnich, Werner. Interference recognition circuit in a heart pacemaker. 4,516,579, Cl. 128-419.0PG.
Irving, Graeme N.: *See—*
Clarke, Terence A.; Edwards, Richard B.; and Irving, Graeme N., 4,517,107, Cl. 252-108.000.
Irwin Measuring Tool Inc.: *See—*
Cohen, Howard; and Pakus, Edward, 4,516,325, Cl. 33-138.000.
Ise, Masahiro; Machino, Katsuyuki; Tanaka, Hidehiko; and Matsubara, Toshiyuki, to Sharp Kabushiki Kaisha. Transmitter/receiver circuit for signal transmission over power wiring. 4,517,548, Cl. 340-310.00R.
Iseki & Co., Ltd.: *See—*
Nishihara, Tadao, 4,516,654, Cl. 180-255.000.
Ishibashi, Kodo: *See—*
Sekine, Kunio; Masuda, Hitoshi; Ishibashi, Kodo; Hirai, Masahide; Tomoshige, Shozo; and Kondo, Kozo, 4,517,096, Cl. 210-668.000.

Ishida, Tomio: *See*—
Nakahara, Mitsuharu; Ishida, Tomio; Honjo, Norifumi; and Yoshida, Yoshitaka, 4,516,537, Cl. 123-48.0AA.
Ishigaki, Yukinobu, to Victor Company of Japan, Ltd. Circuit arrangement for reconstructing noise-affected signals. 4,517,518, Cl. 328-165.000.
Ishigami, Michifumi: *See*—
Kako, Mitumasa; and Ishigami, Michifumi, 4,516,508, Cl. 108-7.000.
Ishii, Nolihisa: *See*—
Miura, Nobuo; and Ishii, Nolihisa, 4,516,554, Cl. 123-418.000.
Ishii, Thomas K.; and Jorgensen, Jorgen A., to Northland Aluminum Products, Inc. Cavity antenna microwave powered turntable. 4,517,432, Cl. 219-10.55F.
Ishikawa, Masayuki; Azuma, Hiroshi; Sugimoto, Akiko; Takahashi, Noriko; and Takashima, Yoshimi, to Showa Denko K.K. 2,6,7,8-Substituted quinazolines, process for production thereof, and use thereof. 4,517,189, Cl. 514-259.000.
Ishikawa, Sueyoshi: *See*—
Hisamoto, Iwao; Omure, Yukio; and Ishikawa, Sueyoshi, 4,517,108, Cl. 252-162.000.
Ishikura, Tomoyuki: *See*—
Yoshioka, Takeo; Yamamoto, Kenichi; Fukagawa, Yasuo; Shimsuchi, Yasutaka; and Ishikura, Tomoyuki, 4,517,127, Cl. 260-245.20T.
Iso, Tadashi; and Oya, Masayuki, to Santen Pharmaceutical Co., Ltd. Cysteine derivatives of disulfide form. 4,517,123, Cl. 260-239.30R.
Isomet Corporation: *See*—
Bademian, Leon, 4,516,838, Cl. 350-358.000.
Isono, Kiyoshi; Nakamura, Goto; and Fujita, Shigeo, to Rikagaku Kenkyusho; and Kaken Kagaku Kabushiki Kiasha. Novel antibiotic 76-11, process for the production thereof, anticoccidiosis agent and domestic animals growth accelerator comprising the same as an effective ingredient. 4,517,178, Cl. 424-122.000.
Isshiki, Tomiya; Nawata, Takanari; Kijima, Yasuhiko; Ito, Akira; and Watanabe, Takayuki, to Mitsubishi Gas Chemical Company, Inc. Process for producing vinyl acetate. 4,517,377, Cl. 560-261.000.
Ito, Akinori: *See*—
Kizawa, Hidenori; Fujiyama, Norimasa; Kobayashi, Jitsuo; and Ito, Akinori, 4,517,173, Cl. 424-16.000.
Ito, Akira: *See*—
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Ito, Ryosuke: *See*—
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Ito, Sadayuki: *See*—
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Itoh, Katsuoki: *See*—
Fussner, Paul; Hofmann, Karl; Komaroff, Iwan; Itoh, Katsuoki; Seifert, Kurt; Trachte, Dietrich; Vogel, Wilhelm; and Vogtmann, Hans-Jorg, 4,516,729, Cl. 239-453.000.
Itoh, Masayuki: *See*—
Miyauchi, Masami; and Itoh, Masayuki, 4,517,158, Cl. 420-584.000.
Itoh: Yoji: *See*—
Kumagai, Naotake; Tatemoto, Minoru; Itoh: Yoji; and Inuzuka, Tokushige, 4,516,545, Cl. 123-192.00R.
ITT Industries, Inc.: *See*—
Drake, Cyril F.; and Jones, Ronald, 4,517,006, Cl. 71-64.110.
Fennel, Helmut, 4,517,684, Cl. 377-19.000.
Lindstedt, Guenter; and Nopper, Guido H., 4,517,529, Cl. 331-1.00A.
Thompson, George H. B., 4,517,581, Cl. 357-30.000.
Itzchak, Zeev B.: *See*—
Berman, Oded; Eilam, Zohar; and Itzchak, Zeev B., 4,516,950, Cl. 446-297.000.
Ivory, Dawn M.; Miller, Granville G.; Chance, Ronald R.; and Baughman, Ray H., to Allied Corporation. Electrically conducting compositions of doped polyphenylenes and shaped articles comprising the same. 4,517,116, Cl. 252-500.000.
Iwabuchi, Hidetoshi; and Okumura, Takeo, to Kao Corporation. Hair cosmetics. 4,517,175, Cl. 424-70.000.
Iwamoto, Katsuo: *See*—
Goto, Tomomichi; Iwamoto, Katsuo; Kobayashi, Yoshinori; and Matoba, Isao, 4,517,032, Cl. 148-111.000.
Iwao, Noriyuki: *See*—
Tsutsui, Eiji; Yoshioka, Masahiro; Murakami, Masahiro; and Iwao, Noriyuki, 4,516,849, Cl. 355-15.000.
Iwasa, Susumu; Yoshida, Isamu; and Kondo, Koichi, to Takeda Chemical Industries, Ltd. Method for enzyme immunoassay and peptide-enzyme conjugate and antibody therefor. 4,517,290, Cl. 435-7.000.
Iwata, Hitoshi: *See*—
Sugisawa, Ko; Sekiguchi, Kazuya; Taguchi, Masao; Nakatani, Masayuki; and Iwata, Hitoshi, 4,516,596, Cl. 137-240.000.
Iwaya Corporation: *See*—
Saigo, Hiroshi; and Kaneko, Hiroshi, 4,516,951, Cl. 446-338.000.
Iwaya, Shoichi: *See*—
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Iyoda, Shozo: *See*—
Ubukata, Susumu; Mizutani, Yasukazu; and Iyoda, Shozo, 4,517,541, Cl. 337-89.000.
Izen, Ronald L.: *See*—
Topalian, Joan A.; and Izen, Ronald L., 4,516,282, Cl. 5-72.000.
J.F.S., Inc.: *See*—
Johnson, David A., 4,516,515, Cl. 114-197.000.
J & P Coats, Limited: *See*—
Hampson, Jack T., 4,516,411, Cl. 66-64.000.
J. W. Lighting Inc.: *See*—
Mullins, Jack R., 4,517,631, Cl. 362-346.000.
J. Wagner GmbH: *See*—
Boll, Hans-Joachim, 4,517,620, Cl. 361-154.000.
Jabs, Gert: *See*—
Dahm, Manfred; Weimann, Norbert; Nehen, Ulrich; Muller, Hanns P.; Jabs, Gert; Awater, Albert; and Barnes, James M., 4,517,141, Cl. 264-4.700.
Jack Prince, Inc.: *See*—
Prince, Jack A.; and Standridge, Bobby D., 4,516,731, Cl. 241-24.000.
Jackson, John S., to General Motors Corporation. Supercharged engine charge control. 4,516,401, Cl. 60-602.000.
Jackson, W. Shaun. Pannier with hook and spring mechanism. 4,516,705, Cl. 224-32.00A.
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, to Societe Anonyme dite: L'Oreal. Hair treatment compositions based on poiycationic polymers. 4,517,174, Cl. 424-62.000.
Jadwin, Thomas A.; and Rimai, Donald S., to Eastman Kodak Company. Electrostatic dry toner composition. 4,517,272, Cl. 430-110.000.
Jagisch, Frank C.: *See*—
Agarwal, Pawan K.; Lundberg, Robert D.; Wagensomer, Joseph; and Jagisch, Frank C., 4,517,250, Cl. 428-483.000.
Jahel, Alfred. Collapsible display hanger for perforated display panels. 4,516,681, Cl. 211-59.100.
Jahier, Giovanni, to UNICAL S.p.A. Steel construction solid-fuel firing boiler for civil heating applications. 4,516,534, Cl. 122-15.000.
Jahn, Dieter: *See*—
Becker, Rainer; Jahn, Dieter; Keil, Michael; Himmele, Walter; and Wuerzer, Bruno, 4,517,013, Cl. 71-98.000.
Jain, Kantilal; and Latta, Milton R., to International Business Machines Corporation. Apparatus for transformation of a collimated beam into a source of required shape and numerical aperture. 4,516,832, Cl. 350-96.240.
Janitschke, Lothar; and Hoffmann, Werner, to BASF Aktiengesellschaft. 1-Formyl-tri- and tetramethyl-cyclohex-1-en-3-one oximes. 4,517,382, Cl. 564-267.000.
Japan Pionics Co., Ltd.: *See*—
Koiso, Yasuhiko; Ohtsuka, Kenji; and Yahara, Shigeo, 4,516,564, Cl. 126-263.000.
Japan Steel Works, Ltd., The: *See*—
Fujita, Daijiro; Motoo, Akihiko; and Maki, Yoshiki, 4,516,925, Cl. 425-463.000.
Japan Synthetic Rubber Co., Ltd.: *See*—
Wada, Noriaki, 4,517,332, Cl. 524-506.000.
Jaynes, Jesse M.: *See*—
Strobel, Gary A.; Gavlak, Andrea H.; and Jaynes, Jesse M., 4,517,008, Cl. 71-77.000.
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JENAer Glaswerk, Schott & Gen.: *See*—
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Jenkins, Robert D., to Reilich, David G.; and Quinn, Jeffrey J., part interest to each. Picture frame assembly. 4,516,341, Cl. 40-152.000.
Jenkins, Stuart M.: *See*—
Wood, John; Timson, Christopher M.; and Jenkins, Stuart M., 4,516,899, Cl. 414-330.000.
Jennie, Fred, to Weatherby, Inc. Mechanism providing positive safety with bolt locked. 4,516,466, Cl. 89-145.000.
Jennmar Corporation: *See*—
Calandra, Frank, Jr., 4,516,885, Cl. 405-261.000.
Jensen, N. Due; and Nielsen, K. Frank, to Grundfos A/S. Pumping plant. 4,516,915, Cl. 417-365.000.
Jensen, Philip W.: *See*—
Stawski, Karl-Heinz; and Jensen, Philip W., 4,516,561, Cl. 126-25.00B.
Jepsen, John C., to Shell Oil Company. Two-phase flow splitter. 4,516,986, Cl. 55-18.000.
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, to Centre National de la Recherche Scientifique. Method of increasing the supraconductive critical temperature in quasi unidimensional organic supraconductors and new supraconductive compounds thus obtained. 4,517,141, Cl. 260-239.00R.
Jodden, Klaus; Heymer, Gero; and Stephan, Hans-Werner, to Hoechst Aktiengesellschaft. Process for making titanium dioxide concentrates. 4,517,163, Cl. 423-75.000.
Johnson, Daniel D.; and Fritz, Herbert L., to Du Pont de Nemours, E. I., and Company. Process for forming conductive through-holes through a dielectric layer. 4,517,050, Cl. 156-643.000.
Johnson, David A., to J.F.S., Inc. Boat plug reminder and method for use thereof. 4,516,515, Cl. 114-197.000.
Johnson & Johnson: *See*—
Popescu, Miron; and Gunsalus, Edward K., 4,517,167, Cl. 423-245.000.
Johnson Matthey Public Limited Company: *See*—
Russell, Michael J. H.; and Murrer, Barry A., 4,517,390, Cl. 568-881.000.

Johnson, Robert S.; Fletcher, Paul E.; Benjamin, William S.; and Zaitvay, John I., to Lighthouse for the Blind, Incorporated, The. Angled roller mop. 4,516,287, Cl. 15-119.00A.
Johnson Service Company: *See*—
Dietz, Gerald E., 4,516,930, Cl. 431-26.000.
Johnston, David B. R., to Merck & Co., Inc. 2-Amino-3,5-dicyano-6-(substituted)pyrazine antimicrobial compounds. 4,517,186, Cl. 514-255.000.
Johnston, Harold; and Benoit, Richard E., to Northern Telecom Limited. Entrance terminal for telecommunications cables. 4,516,818, Cl. 339-36.000.
Jonelis, Robert E. Apparatus and method for straightening electrostatic precipitator collector plates. 4,516,992, Cl. 55-145.000.
Jones, Herbert, administrator: *See*—
Glamkowski, Edward J.; Jones, Michael C., deceased; and Jones, Herbert, administrator, 4,517,311, Cl. 514-462.000.
Jones, J. Phillip. Fish growing system. 4,516,528, Cl. 119-3.000.
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Jones, Randy T.: *See*—
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Jones, Ronald: *See*—
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Joy Manufacturing Company: *See*—
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Junkosha Co., Ltd.: *See*—
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Jutand, Anny: *See*—
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Kabushiki Kaisha Daini Seikosha: *See*—
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Kabushiki Kaisha Ishida Koki Seisakusho: *See*—
Fukuda, Masao, 4,516,644, Cl. 177-25.000.
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Kabushiki Kaisha Komatsu Seisakusho: *See*—
Kitagawa, Shinichi, 4,517,649, Cl. 364-472.000.
Sato, Yoshito; Yato, Tokuhiro; Maeo, Hidemi; and Tsutsumi, Yoshio, 4,516,469, Cl. 91-362.000.
Uchimura, Toshio, 4,516,755, Cl. 254-344.000.
Kabushiki Kaisha Meidensha: *See*—
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Kabushiki Kaisha Miyano Tekkosho: *See*—
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Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Honji, Kunihiko; and Aoki, Toshiyuki, 4,517,504, Cl. 318-568.000.
Kabushiki Kaisha Suwa Seikosha: *See*—
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Kabushiki Kaisha Toshiba: *See*—
Chiba, Mitsuyoshi, 4,516,408, Cl. 62-238.700.
Hiroi, Kazuo; and Kojima, Kenji, 4,516,929, Cl. 431-12.000.
Kabushiki Kaisha Toyoda Jidoh Shokki Seisakusho: *See*—
Yuki, Katsumi; Yoshida, Susumu; Ozeki, Mineo; Miyazaki, Yasuyuki; and Kawamata, Masaru, 4,517,645, Cl. 364-424.000.
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Mimura, Nobuharu; Yoshida, Kazunori; Kawabata, Susumu; and Hasegawa, Junzo, 4,516,611, Cl. 139-452.000.
Kabushikigaisha Kyowa Chuzosho: *See*—
Tadashi, Ii; and Saichi, Egusa, 4,517,018, Cl. 75-129.000.
Kagawa, Nobuaki; Fujimori, Noboru; Tanaka, Shigeo; and Onodera, Kaoru, to Konishiroku Photo Ind. Co., Ltd. Light-sensitive silver halide photographic material. 4,517,284, Cl. 430-591.000.
Kaibel, Gerd: *See*—
Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 368-885.000.
Kaichi, Higuchi: *See*—
Hirobumi, Saito; Kiyoshi, Ito; Kaichi, Higuchi; and Masao, Yamamoto, 4,516,944, Cl. 441-40.000.
Kajaani Oy: *See*—
Kela, Heino; and Laspa, Matti, 4,516,732, Cl. 241-24.000.
Kakeba, Masakatsu: *See*—
Umetsu, Yoshihiro; Muraishi, Masakazu; Ito, Osamu; and Kakeba, Masakatsu, 4,516,788, Cl. 280-6.00R.
Kaken Kagaku Kabushiki Kiasha: *See*—
Isono, Kiyoshi; Nakamura, Goto; and Fujita, Shigeo, 4,517,178, Cl. 424-122.000.
Kakimoto, Atsushi; and Takita, Masaaki, to Matsushita Electric Industrial Co., Ltd. Recording paper clamping apparatus. 4,517,575, Cl. 346-138.000.
Kako, Mitumasa; and Ishigami, Michifumi, to Brother Kogyo Kabushiki Kaisha. Desk apparatus. 4,516,508, Cl. 108-7.000.
Kakuhashi, Takeshi; Tahara, Hiroshi; and Mori, Yoshihisa, to Nitto Electric Industrial Co., Ltd. Resistor sheet input tablet for the input of two-dimensional patterns. 4,517,546, Cl. 338-320.000.
Kakuta, Yoshiyuki: *See*—
Saito, Tadao; Kishi, Takao; and Kakuta, Yoshiyuki, 4,516,727, Cl. 239-333.000.
Kalama Chemical, Inc.: *See*—
Marinak, Michael J.; and Simonson, John L., 4,517,369, Cl. 546-345.000.
Kalina, Robert F.: *See*—
Gliwa, William F.; and Kalina, Robert F., 4,516,737, Cl. 242-77.000.
Kaljee, Jan; Lalor, Leo J.; Pagani, Sergio M.; and Robinson, Frederick P. A., to Nasionale Sweisware (Eiendoms) Beperk. Welding electrode. 4,517,441, Cl. 219-146.230.
Kaltz, Milton C.; Alexander, Michael P.; and Cichoski, Richard, to ASC Incorporated. Vehicle with a convertible top. 4,516,803, Cl. 296-107.000.
Kamanaka, Tamaki: *See*—
Kumasaka, Sadao; Tada, Satomi; Horikoshi, Shigeo; Kamanaka, Tamaki; and Taniguchi, Hiroshi, 4,517,312, Cl. 521-47.000.
Kamata, Tsutomu: *See*—
Masuno, Katsuyoshi; and Kamata, Tsutomu, 4,516,557, Cl. 123-619.000.
Kamei, Tsuneaki: *See*—
Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, 4,517,444, Cl. 219-216.000.
Kampe, Wolfgang: *See*—
Bosies, Elmar; Kampe, Wolfgang; Thiel, Max; Bicker, Uwe; and Boerner, Dietmar, 4,517,183, Cl. 514-183.000.
Kamyr, Inc.: *See*—
Richter, Ole J.; and Richter, Johan C. F. C., 4,516,887, Cl. 406-63.000.
Kanda, Katsumi; Okamura, Takaaki; Minamigi, Takashi; Inui, Tsuneo; and Kondo, Yoshikazu, to Toyo Kohan Co., Ltd. Method for production of metal sheet covered with polyester resin film. 4,517,255, Cl. 428-626.000.
Kanda Tushin Kogyo: *See*—
Nagasaki, Yoshio, 4,517,409, Cl. 179-81.00C.
Kanda, Yoshiro; Noguchi, Hironori; and Ikeda, Tadashi, to Mitutoyo Mfg. Co., Ltd. Touch signal probe. 4,516,327, Cl. 33-169.00R.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Mitani, Toragoro; Yasui, Hideo; and Morikawa, Hisashi, 4,517,344, Cl. 526-62.000.
Sakata, Yoshio, 4,517,539, Cl. 335-302.000.
Kaneko, Hiroshi: *See*—
Saigo, Hiroshi; and Kaneko, Hiroshi, 4,516,951, Cl. 446-338.000.
Kani, Hirofumi. Device for guiding a player in performance of a keyboard instrument. 4,516,465, Cl. 84-470.00R.
Kano, Seishi: *See*—
Sonoda, Sakae; Nagae, Yoshio; and Kano, Seishi, 4,517,029, Cl. 148-6.15Z.
Kanotz, William M., to AT&T Technologies, Inc. Hybrid apparatus for insulating conductors. 4,516,922, Cl. 425-113.000.
Kao Corporation: *See*—
Iwabuchi, Hidetoshi; and Okumura, Takeo, 4,517,175, Cl. 424-70.000.
Kapp, David C.: *See*—
Birkmeyer, William J.; Gray, Ralph C.; Dowbenko, Rostyslaw; Kapp, David C.; VanBuskirk, Ellor J.; and Maska, Rudolf, 4,517,322, Cl. 523-501.000.
Kappl, Gerhard; Kranner, Helmut; and Lihl, Reinhard, to C. Reichert Optische Werke. Drive-control system for a microtome, in particular an ultramicrotome. 4,516,459, Cl. 83-713.000.
Kardinal, Hans-Joachim, to Siemens Aktiengesellschaft. Pneumatic dispatch system having a plurality of forwarding tube paths and an arrangement to transfer between two tube paths. 4,516,888, Cl. 406-182.000.
Karjalainen, Arto J.: *See*—
Kurkela, Kauko O. A.; and Karjalainen, Arto J., 4,517,198, Cl. 514-400.000.
Karl Meinig, KG: *See*—
Meinig, Manfred, 4,516,797, Cl. 285-405.000.
Karloske, Joan E.: *See*—
Cordts, Howard P.; and Karloske, Joan E., 4,517,326, Cl. 524-310.000.
Karlson, Eskil L. Sterilizer. 4,517,159, Cl. 422-20.000.
Karlsson, Harry L., to Santrade Ltd. Rotary drill bit. 4,516,640, Cl. 175-227.000.
Kashihara, Tomio; Tsuruta, Toshiro; Yamaguchi, Masayoshi; Yokoi, Kiyotachi; and Suzuki, Etsuji, to Tokyo Shibaura Denki Kabushiki Kaisha. Apparatus for conveying a lead frame mounting semiconductor pellets. 4,516,673, Cl. 198-341.000.
Katalco Corporation: *See*—
Clements, Porter, 4,517,077, Cl. 208-216.00R.
Kataoka, Isao: *See*—
Yamanaka, Koichi; Gotoh, Tetsuro; Aoki, Masanori; Kataoka, Isao; and Nishiwaki, Shunro, 4,517,091, Cl. 210-512.100.
Katila, Michael J.: *See*—
Chazan, David; and Katila, Michael J., 4,517,449, Cl. 219-549.000.
Kato, Manabu: *See*—
Aoyoma, Shunichi; and Kato, Manabu, 4,516,542, Cl. 123-90.160.
Kato, Toshio: *See*—
Shimizu, Shigeo; and Kato, Toshio, 4,517,257, Cl. 428-694.000.
Katsumata, Tsutomu; and Yokota, Masahisa, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for methylating the ortho position of a phenol. 4,517,389, Cl. 568-804.000.
Kaufman, Jack W.; and Gardner, Donald E. Medical device. 4,516,970, Cl. 604-270.000.
Kaumeheiwa, Algen K.: *See*—
Fizyta, Wojciech L.; and Kaumeheiwa, Algen K., 4,516,288, Cl. 15-250.040.

Kawabata, Susumu: *See*—
Mimura, Nobuharu; Yoshida, Kazunori; Kawabata, Susumu; and Hasegawa, Junzo, 4,516,611, Cl. 139-452.000.

Kawahito, Takashi; Himukashi, Yoshinori; and Yamada, Tetsuo, to UBE Industries, Ltd. Grinding amorphous silicon nitride powder prior to heating to produce crystalline silicon nitride powder. 4,517,168, Cl. 423-344.000.

Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, to Hitachi, Ltd. Thermal printhead. 4,517,444, Cl. 219-216.000.

Kawai, Hisasi: *See*—
Ina, Toshikazu; Kawai, Hisasi; Kohama, Tokio; Obayashi, Hideki; Sawada, Daisaku; and Shigematsu, Takashi, 4,517,648, Cl. 364-431.010.

Kawakita, Takeshi: *See*—
Imanaka, Hiroshi; Miyoshi, Toshio; Konomi, Toshio; Kubochi, Yoshiaki; Hattori, Seiziro; and Kawakita, Takeshi, 4,517,299, Cl. 435-197.000.

Kawamata, Masaru: *See*—
Yuki, Katsumi; Yoshida, Susumu; Ozeki, Mineo; Miyazaki, Yasuyuki; and Kawamata, Masaru, 4,517,645, Cl. 364-424.000.

Kawano, Takashi: *See*—
Tatsumi, Hisao; and Kawano, Takashi, 4,517,445, Cl. 219-297.000.

Kawasaki, Kikuo; and Sano, Tomomi, to Fuji Electric Company, Ltd. Automatic vending machine. 4,517,651, Cl. 364-479.000.

Kawasaki Steel Corporation: *See*—
Goto, Tomomichi; Iwamoto, Katsuo; Kobayashi, Yoshinori; and Matoba, Isao, 4,517,032, Cl. 148-111.000.
Takasaki, Junsuke; Sato, Hirotake; and Yasuda, Akira, 4,517,031, Cl. 148-12.00C.

Kawashima, Ryozo, to Nihon Electric Co. Ltd. Air cleaning apparatus. 4,516,991, Cl. 55-124.000.

Kayser, Thomas: *See*—
Eiermann, Kurt; and Kayser, Thomas, 4,516,872, Cl. 403-24.000.

Kee, Richard C.; and Norris, Philip R., to Polaroid Corporation. Film cassette usable as processing chamber. 4,516,844, Cl. 354-275.000.

Keebler Company: *See*—
Thornton, Ian; DeWitt, Kenneth W.; and Robertson, Simon A., 4,517,209, Cl. 426-383.000.

Keeney, Keith; and Wehner, Dennis J., to Schroeder Brothers Corporation. Method and apparatus for controlling a rotary percussive hydraulic drill. 4,516,467, Cl. 91-31.000.

Keil, Michael: *See*—
Becker, Rainer; Jahn, Dieter; Keil, Michael; Himmele, Walter; and Wuerzer, Bruno, 4,517,013, Cl. 71-98.000.

Keitel, Murray: *See*—
Gravina, Anthony N.; Keitel, Murray; Weiss, Harvey; Wiley, Joseph N.; and Charland, Edmund G., Jr., 4,517,161, Cl. 422-95.000.

Kela, Heino; and Laspa, Matti, to Kajaani Oy. Method and apparatus for comminuting stumps. 4,516,732, Cl. 241-24.000.

Keller, Patrick N.; and Seal, Clinton D., to United States of America, Navy. Video multiplexer. 4,517,593, Cl. 358-107.000.

Kelley, Fred W., Jr., to General Electric Company. Line-commutated converter circuit. 4,517,635, Cl. 363-136.000.

Kellogg, Michael S., to Pfizer Inc. Penicillanic acid derivative. 4,517,126, Cl. 260-245.20R.

Kemp, Allan E.: *See*—
Kemp, Gail W., 4,516,921, Cl. 418-141.000.

Kemp, Gail W., to Kemp, Vida M.; Carter, Phyllis J.; Kemp, Ruth E.; and Kemp, Allan E. End seals for a rotary machine. 4,516,921, Cl. 418-141.000.

Kemp, Ruth E.: *See*—
Kemp, Gail W., 4,516,921, Cl. 418-141.000.

Kemp, Vida M.: *See*—
Kemp, Gail W., 4,516,921, Cl. 418-141.000.

Kemper, Christian T.; Osborne, Robert L.; and Bellows, James C., to Westinghouse Electric Corp. Diagnostic system and method. 4,517,468, Cl. 290-52.000.

Kempter, Fritz E.: *See*—
Schupp, Eberhard; and Kempter, Fritz E., 4,517,343, Cl. 525-488.000.

Kennedy, Warren C.: *See*—
Scarton, Henry A.; DiBianca, John A.; Lacey, James A.; and Kennedy, Warren C., 4,516,658, Cl. 181-208.000.

Kernforschungszentrum Karlsruhe G.m.b.H.: *See*—
Szelagowski, Peter; and Motzkau, Siegfried, 4,516,521, Cl. 118-50.000.

Kerotest Manufacturing Corp.: *See*—
Owoc, James R., 4,516,754, Cl. 251-335.00B.

Kerr, George T.: *See*—
Dessau, Ralph M.; and Kerr, George T., 4,517,075, Cl. 208-111.000.

Kerry, John C.; and Weighton, David M., to FBC Limited. Synergistic compositions and methods of combating insects employing amitraz and cypermethrin. 4,517,201, Cl. 514-521.000.

Kersten, Jean; and Mathias, Jean M., to Baxter Travenol Laboratories, Inc. Low volume, large area filters for IV or blood filtration. 4,517,090, Cl. 210-493.200.

Keutzer, Larry L.: *See*—
Gault, Roger B.; and Keutzer, Larry L., 4,517,465, Cl. 250-492.200.

Key Medical, Inc.: *See*—
Saron, John R., 4,517,499, Cl. 315-362.000.

Kiefer, Werner; and Stetter, Klaus, to JENAer Glaswerk, Schott & Gen. Process for the thermal tempering of glass. 4,516,999, Cl. 65-116.000.

Kieffer, Eduard P.: *See*—
Hoek, Arend; and Kieffer, Eduard P., 4,517,396, Cl. 585-415.000.

Kieta, Harold J.: *See*—
Hopkins, Ronald J.; Thomas, Evan G.; and Kieta, Harold J., 4,517,106, Cl. 252-79.400.

Kijima, Yasuhiko: *See*—
Isshiki, Tomiya; Nawata, Takanari; Kijima, Yasuhiko; Ito, Akira; and Watanabe, Takayuki, 4,517,377, Cl. 560-261.000.

Kik, Leendert A.; and Schuurink, Pieter H. J., to Akzo nv. Process for applying a coating composition to a substrate, and the coated substrate thus obtained. 4,517,248, Cl. 428-457.000.

Kikuchi, Yoshiki: *See*—
Murayama, Tomio; Kikuchi, Yoshiki; and Ohmori, Takashi, 4,517,560, Cl. 340-790.000.

Kikuya, Satoshi: *See*—
Shibaike, Narito; Minamide, Seiko; Kikuya, Satoshi; Terada, Hiroshi; and Zaitsu, Osamu, 4,517,613, Cl. 360-85.000.

Kilbourn, Harlan C.: *See*—
Bennett, Ross L.; Price, Robert B.; Springen, Clyde H.; and Kilbourn, Harlan C., 4,517,652, Cl. 364-513.000.

Kim, Wontaik; and Azad, Farzin H., to General Electric Company. Non-contact sensing apparatus and method for polymer melt temperature profile determination. 4,516,864, Cl. 374-130.000.

Kimball, Michael E.: *See*—
Parker, Dane K.; Kuczkowski, Joseph A.; and Kimball, Michael E., 4,517,331, Cl. 524-451.000.

Kimber, Ian D.: *See*—
Clark, Duncan G. D.; Kimber, Ian D.; and May, Roderick G., 4,517,679, Cl. 375-37.000.

Kimura, Katsuhiko: *See*—
Shioya, Toshio; and Kimura, Katsuhiko, 4,516,555, Cl. 123-470.000.

Kimura, Kenji, to Olumpus Optical Company Limited. Video recording system. 4,517,611, Cl. 360-33.100.

King, Lionel W. Assembly system. 4,516,376, Cl. 52-648.000.

Kington, Alan D.: *See*—
Mills, David; Kington, Alan D.; and Close, Rodney J., 4,516,621, Cl. 164-339.000.

Kinney, Daniel C., to United States of America, Air Force. Nickel-cadmium battery conditioner and tester apparatus. 4,517,517, Cl. 324-433.000.

Kinoda, Seiji: *See*—
Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, 4,517,282, Cl. 430-399.000.

Kintner, Michael H., to Medtech Plastics, Inc. Control syringe. 4,516,969, Cl. 604-187.000.

Kirchner, Georg, to Sanimed Vertrieb AG. Tourniquet strap or band for restricting blood flow, especially for taking blood samples. 4,516,576, Cl. 128-327.000.

Kirschenman, Duane L., to AT&T Technologies, Inc. Methods of processing substrates. 4,516,318, Cl. 29-846.000.

Kirtland, John A.: *See*—
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.

Kishi, Takao: *See*—
Saito, Tadao; Kishi, Takao; and Kakuta, Yoshiyuki, 4,516,727, Cl. 239-333.000.

Kishimoto, Keiichi: *See*—
Harashima, Asao; Nakamura, Takashi; and Kishimoto, Keiichi, 4,517,150, Cl. 264-300.000.

Kisler, Semyon, to Polaroid Corporation. Method and apparatus for uniformly charging a moving web. 4,517,143, Cl. 264-22.000.

Kisner, Howard D., to General Motors Corporation. Magnetron sputtering cathode assembly and magnet assembly therefor. 4,517,070, Cl. 204-298.000.

Kitagawa, Shinichi, to Kabushiki Kaisha Komatsu Seisakusho. Automatic die-interchanging control system of a press machine. 4,517,649, Cl. 364-472.000.

Kitamura, Takashi, to Canon Kabushiki Kaisha. Electrostatic recording apparatus forming small non-recording regions in a recording field. 4,517,579, Cl. 346-160.000.

Kitano, Kyozo: *See*—
Ando, Hideo; Kiyama, Kentaro; and Kitano, Kyozo, 4,517,113, Cl. 252-353.000.

Kiyama, Kentaro: *See*—
Ando, Hideo; Kiyama, Kentaro; and Kitano, Kyozo, 4,517,113, Cl. 252-353.000.

Kiyokane, Jerrilyn C., to Namkung Promotions Inc. Advertising article and method of making same. 4,516,793, Cl. 283-103.000.

Kiyoshi, Ito: *See*—
Hirobumi, Saito; Kiyoshi, Ito; Kaichi, Higuchi; and Masao, Yamamoto, 4,516,944, Cl. 441-40.000.

Kizawa, Hidenori; Fujiyama, Norimasa; Kobayashi, Jitsuo; and Ito, Akinori, to Nippon Soda Co. Ltd. Mucous membrane-adhering film preparation and process for its preparation. 4,517,173, Cl. 424-16.000.

Klecka, Miro E., to Shell Oil Company. Removal of $H_2S$ from sour gas streams with subsequent sulfur separation. 4,517,170, Cl. 423-573.00R.

Klein, Joseph T.: *See*—
Effland, Richard C.; Klein, Joseph T.; and Hamer, R. Richard L., 4,517,195, Cl. 514-413.000.

Klein, Klaus-Walter; Bocker, Jurgen; Glotz, Gerhard; and Gersbach, Klaus, to Rheinmetall GmbH. Impact projectile assembly. 4,516,502, Cl. 102-523.000.

Klein, Rudolf: *See*—
Dettke, Manfred; and Klein, Rudolf, 4,517,060, Cl. 204-44.000.

Klimeck, Hugo; and Wilken, Gerhard, to Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H. Device for interconnecting two sections of a longwall mining machine track. 4,516,809, Cl. 299-43.000.

Klinner, Wilfred E., to National Research Development Corporation. Apparatus and method of picking up and conveying cut crop. 4,516,390, Cl. 56-364.000.

Klockner-Humboldt-Deutz AG: *See*—
Steinbiss, Eberhard; and Herchenbach, Horst, 4,517,020, Cl. 106-100.000.

Klocksiem, Howard W. Fishing bobber. 4,516,349, Cl. 43-17.500.

Klose, Sigmar: *See*—
Scheibe, Peter; Bernt, Erich; and Klose, Sigmar, 4,517,287, Cl. 435-4.000.

Kloster, Kenneth D. Spring compressor. 4,516,303, Cl. 29-227.000.

Knapp, John F.: *See*—
Gruber, Robert J.; Knapp, John F.; and Bolte, Steven B., 4,517,268, Cl. 430-39.000.

Knight Manufacturing Company, Inc.: *See*—
Firmin, Herman P., 4,516,352, Cl. 43-42.260.

Knoll International, Inc.: *See*—
Unger, Goetz W., 4,516,305, Cl. 29-448.000.

Knopf, William H., to American Hoechst Corporation. Extrusion die and process for thickness control. 4,517,145, Cl. 264-40.200.

Knowles, Terrance: *See*—
Deitch, Leonard; and Knowles, Terrance, 4,517,559, Cl. 340-712.000.

Knox, David J. Apparatus for wetting apertured discs. 4,516,523, Cl. 118-500.000.

Kobayashi, Isao: *See*—
Takakuwa, Shilo; Kobayashi, Isao; Takahashi, Tastuo; and Imamizu, Shige, 4,516,311, Cl. 29-568.000.

Kobayashi, Jitsuo: *See*—
Kizawa, Hidenori; Fujiyama, Norimasa; Kobayashi, Jitsuo; and Ito, Akinori, 4,517,173, Cl. 424-16.000.

Kobayashi, Kazuo: *See*—
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, 4,517,087, Cl. 210-396.000.

Kobayashi, Masatsune; Haruta, Masahiro; Eida, Tsuyoshi; and Ohta, Tokuya, to Canon Kabushiki Kaisha. Recording medium and ink jet recording paper. 4,517,244, Cl. 428-342.000.

Kobayashi, Satoru; Masaki, Mikio; Sakuno, Hideaki; Shimizu, Keiichi; and Fukasawa, Takeshi, to Kokusan Kinzoku Kogyo Kabushiki Kaisha. Steering lock for automobiles. 4,516,415, Cl. 70-252.000.

Kobayashi, Yoshikata, to Tokyo Shibaura Denki Kabushiki Kaisha. Hydraulically-operated breaking device. 4,516,472, Cl. 91-392.000.

Kobayashi, Yoshinori: *See*—
Goto, Tomomichi; Iwamoto, Katsuo; Kobayashi, Yoshinori; and Matoba, Isao, 4,517,032, Cl. 148-111.000.

Kobayashi, Yukio: *See*—
Sugitani, Yuji; and Kobayashi, Yukio, 4,517,438, Cl. 219-125.120.

Kober AG: *See*—
Huber, Reinhold; and Koster, Waldemar, 4,516,284, Cl. 14-16.500.

Kobler, Ingo, to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft. Rotary printing machine output speed matching system for sheet folder. 4,516,759, Cl. 270-12.000.

Kobrehel, Gabrijela; and Djokic, Slobodan, to Sour Pliva farmaceutska, kemijska prehrambena i kozmeticka industrija, n.sol.o. 11-Methyl-11-aza-4-0-cladinosyl-6-0-desosaminyl-15-ethyl-7,13,14-trihydroxy-3,5,7,9,12,14-hexamethyl-oxacyclopentadecane-2-one and derivatives thereof. 4,517,359, Cl. 536-7.400.

Kocher, Erich J., to Vilter Manufacturing Corporation. Apparatus for separating liquid droplets from gas. 4,516,994, Cl. 55-337.000.

Kockums Cancar, Corp.: *See*—
Gaitten, Walden M., deceased, 4,516,613, Cl. 144-208.00E.

Koeppen, Peter L.: *See*—
Solimeno, Duane; Koeppen, Peter L.; Rogers, Gerald; and Brown, Sammy K., 4,517,656, Cl. 364-900.000.

Koga, Masao: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,517,348, Cl. 526-273.000.

Koga, Yasunori: *See*—
Hamano, Hideo; and Koga, Yasunori, 4,516,443, Cl. 74-711.000.

Kohama, Tokio: *See*—
Ina, Toshikazu; Kawai, Hisasi; Kohama, Tokio; Obayashi, Hideki; Sawada, Daisaku; and Shigematsu, Takashi, 4,517,648, Cl. 364-431.010.

Koiso, Yasuhiko; Ohtsuka, Kenji; and Yahara, Shigeo, to Japan Pionics Co., Ltd. Heat generating body. 4,516,564, Cl. 126-263.000.

Koito, Miyoko: *See*—
Koito, Toshio; Koito, Tetsuo; and Koito, Miyoko, 4,516,586, Cl. 131-246.000.

Koito, Tetsuo: *See*—
Koito, Toshio; Koito, Tetsuo; and Koito, Miyoko, 4,516,586, Cl. 131-246.000.

Koito, Toshio; Koito, Tetsuo; and Koito, Miyoko, to Yugen-gaisha Koito-Seisakusho; Yugen-gaisha Koito-Seimitsu; and Yugen-gaisha Koito-Denki. Reamer for pipe. 4,516,586, Cl. 131-246.000.

Kojima, Kenji: *See*—
Hiroi, Kazuo; and Kojima, Kenji, 4,516,929, Cl. 431-12.000.

Kokubo, Eiichi; Arikawa, Junichi; Goi, Kowichi; and Imura, Shinichi, to Laurel Bank Machine Co., Ltd. Note transfer mechanism in automatic money depositing and disbursing machine. 4,517,451, Cl. 235-379.000.

Kokusan Kinzoku Kogyo Kabushiki Kaisha: *See*—
Kobayashi, Satoru; Masaki, Mikio; Sakuno, Hideaki; Shimizu, Keiichi; and Fukasawa, Takeshi, 4,516,415, Cl. 70-252.000.

Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., to Allied Corporation. N-acyl phosphoric triamide urease inhibitors and urease inhibited urea based fertilizer compositions. 4,517,003, Cl. 71-28.000.

Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., to Allied Corporation. Aminophenol urease inhibitors and urease inhibited urea based fertilizer compositions. 4,517,005, Cl. 71-28.000.

Kolc, Jaroslav F.: *See*—
Anello, Louis G.; Van Der Puy, Michael; Hendrickson, Larry L.; Rogic, Milorad M.; Swerdloff, Michael D.; and Kolc, Jaroslav F., 4,517,002, Cl. 71-28.000.
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Takematsu, Tetsuo; Nakaya, Mitihiko; Moriyasu, Koichi; and Komoto, Nobuo, 4,517,381, Cl. 564-207.000.

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Iwasa, Susumu; Yoshida, Isamu; and Kondo, Koichi, 4,517,290, Cl. 435-7.000.

Kondo, Kozo: *See*—
Sekine, Kunio; Masuda, Hitoshi; Ishibashi, Kodo; Hirai, Masahide; Tomoshige, Shozo; and Kondo, Kozo, 4,517,096, Cl. 210-668.000.

Kondo, Yoshikazu: *See*—
Kanda, Katsumi; Okamura, Takaaki; Minamigi, Takashi; Imui, Tsuneo; and Kondo, Yoshikazu, 4,517,255, Cl. 428-626.000.

Kondoh, Takeo: *See*—
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, 4,517,348, Cl. 526-273.000.

Konishiroku Photo Ind. Co., Ltd.: *See*—
Kagawa, Nobuaki; Fujimori, Noboru; Tanaka, Shigeo; and Onodera, Kaoru, 4,517,284, Cl. 430-591.000.

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Tamura, Takashi, 4,516,764, Cl. 271-34.000.

Konomi, Masao, to Pan Communications, Inc. Acceleration vibration detector. 4,516,428, Cl. 73-585.000.

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Kopfer, Rudolph J. Wet-dry compartmental syringe. 4,516,967, Cl. 604-87.000.

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Kopp, Harold W. Rebound sports training apparatus. 4,516,769, Cl. 273-1.00B.

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Onishi, Kimimasa; Takahashi, Takao; and Koriyama, Masayuki, 4,516,610, Cl. 139-435.000.

Korth, Hans E., to International Business Machines Corporation. Method and apparatus for determining the polarization state of a light wave field. 4,516,855, Cl. 356-367.000.

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Koskovich, Jerome E. Conveyor feed mechanism. 4,516,675, Cl. 198-654.000.

Koss Corporation: *See*—
Baran, Michael S.; Besasie, Joseph C.; Warren, Wayne L.; and Montgomery, Allen W., 4,517,418, Cl. 179-156.00R.

Kosten, Richard B., to GTE Communication Systems Corp. Cantilever spring telephone hookswitch adapted for printed wiring card mounting. 4,517,419, Cl. 179-159.000.

Koster, Waldemar: *See*—
Huber, Reinhold; and Koster, Waldemar, 4,516,284, Cl. 14-16.500.

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Fotiadis, Emanuel; Kozol, Edward J.; Leung, Tak L.; and Paul, Robert J., 4,516,678, Cl. 206-444.000.

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Hennenfent, Douglas J.; Holmstrand, Allan L.; and Kracke, Alan G., 4,517,041, Cl. 156-155.000.

Krahler, Stanley E.; and Remington, William R., to Du Pont de Nemours, E. I., and Company. Manufacture of chloromethyl-substituted polyfluoroalkyl esters. 4,517,376, Cl. 560-87.000.

Krahmer, Hansjorg: *See*—
Skotsch, Carlo; Baumert, Dietrich; Krahmer, Hansjorg; and Arndt, Friedrich, 4,517,367, Cl. 546-276.000.
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Kappl, Gerhard; Kranner, Helmut; and Lihl, Reinhard, 4,516,459, Cl. 83-713.000.
Krasznai, Charles Z.; and Norwood, Richard L., to Black & Decker Inc. Electric toaster oven broiler control. 4,517,452, Cl. 219-413.000.
Krauser, Christopher P., to Ohio Table Pad Company, The. Table pad interlock assembly. 4,517,232, Cl. 428-57.000.
Krautkramer GmbH: *See*—
Pieper, Kurt; and Scharpenberg, Rainer, 4,517,152, Cl. 376-252.000.
Krebs, Jay: *See*—
Freeburg, Thomas A.; and Krebs, Jay, 4,517,669, Cl. 370-82.000.
Krein, Reuben. Free standing, waterproof lining for truck industry. 4,516,906, Cl. 414-786.000.
Kremer, Henry A. F. L.: *See*—
Cukier, Samuel; and Kremer, Henry A. F. L., 4,517,072, Cl. 208-45.000.
Kress, Jack L., to Oscar Mayer Foods Corporation. Method for processing an avian carcass. 4,517,207, Cl. 426-315.000.
Kreutner, William; Green, Michael J.; Shue, Ho-Jane; and Saksena, Anil K., to Schering-Plough Corporation. Method for treating allergic reactions with forskolin. 4,517,200, Cl. 514-455.000.
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Aleem, Mohd A.; and Krinickas, Alexander, Jr., 4,517,479, Cl. 310-54.000.
Kroczynski, Patrice, to Inro France. Hand-secured pushbutton control device. 4,517,424, Cl. 200-52.00R.
Krude, Werner, to Uni-Cardan Aktiengesellschaft. Sealing boot for universal joint. 4,516,959, Cl. 464-175.000.
Kubat, James J.: *See*—
Hicks, John E.; and Kubat, James J., 4,516,638, Cl. 172-22.000.
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Hirooka, Masaaki; Kubo, Keiji; and Yoshihara, Toshiyuki, 4,517,271, Cl. 430-94.000.
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Parker, Dane K.; Kuczkowski, Joseph A.; and Kimball, Michael E., 4,517,331, Cl. 524-451.000.
Kuhlein, Klaus: *See*—
Becherer, Johannes; Kuhlein, Klaus; and Kussmaul, Ulrich, 4,517,370, Cl. 548-217.000.
Kukes, Simon G.; and Banks, Robert L., to Phillips Petroleum Co. Olefin metathesis and catalyst. 4,517,401, Cl. 585-645.000.
Kulite Semiconductor Products, Inc.: *See*—
Kurtz, Anthony D.; Nunn, Timothy A.; and Mallon, Joseph R., 4,516,430, Cl. 73-727.000.
Kumagai, Naotake; Tatemoto, Minoru; Itoh: Yoji; and Inuzuka, Tokushige, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Apparatus for controlling the rolling of an engine. 4,516,545, Cl. 123-192.00R.
Kumasaka, Sadao; Tada, Satomi; Horikoshi, Shigeo; Kamanaka, Tamaki; and Taniguchi, Hiroshi, to Toyo Rubber Chemical Industry Co., Ltd. Process for regenerating resin. 4,517,312, Cl. 521-47.000.
Kunde, Klaus; and Stohr, Frank-Michael, to Bayer Aktiengesellschaft. Symmetrical bis-(triazinyamino phenyl azo acetoacetanilide) dyestuffs. 4,517,357, Cl. 534-605.000.
Kunz, Walter; and Eckhardt, Wolfgang, to Ciba-Geigy Corporation. Azolylmandelic acid derivatives and use thereof for controlling microorganisms. 4,517,194, Cl. 514-184.000.
Kuo, Tsung H. Refuse incineration system. 4,516,511, Cl. 110-346.000.
Kupcikevicius, Vytautas, to Union Carbide Corporation. Apparatus for stuffing large meat articles. 4,516,387, Cl. 53-530.000.
Kureha Kaguku Kogyo Kabushiki Kaisha: *See*—
Terauchi, Takashi; Sato, Koji; and Hoshi, Shoichi, 4,517,397, Cl. 585-428.000.
Kurkela, Kauko O. A.; and Karjalainen, Arto J., to Farmos Group Ltd. Diuretic imidazole derivatives. 4,517,198, Cl. 514-400.000.
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Uchino, Hiroshi; Nakajima, Kihei; and Kurosawa, Ryoichi, 4,517,636, Cl. 363-138.000.
Kurtz, Anthony D.; Nunn, Timothy A.; and Mallon, Joseph R., to Kulite Semiconductor Products, Inc. Economical transducer apparatus for use in the medical field. 4,516,430, Cl. 73-727.000.
Kuse, Kazuki: *See*—
Yoshida, Hiroshi; Akashi, Shunji; and Kuse, Kazuki, 4,516,304, Cl. 29-408.000.
Kussmaul, Ulrich: *See*—
Becherer, Johannes; Kuhlein, Klaus; and Kussmaul, Ulrich, 4,517,370, Cl. 548-217.000.
Kuttner, Thomas: *See*—
Buck, Rainer; Kuttner, Thomas; Piwonka, Fridolin; and Wessel, Wolf, 4,516,550, Cl. 123-357.000.
Kuwayama, Tetsuro; Tanaka, Nobuyoshi; and Hashimoto, Seiji, to Canon Kabushiki Kaisha. Color solid state image pick-up device. 4,517,588, Cl. 358-44.000.
Kuzma, Janusz, to Commonwealth of Australia, The. Cochlear prosthesis package connector. 4,516,820, Cl. 339-48.000.
L. Schuler GmbH: *See*—
Schneider, Franz; and Ruhl, Rolf, 4,516,447, Cl. 83-71.000.
Labib, Mohamed E.; and Wang, Chin C., to RCA Corporation. Stabilizers for CED compositions. 4,517,117, Cl. 252-511.000.
Lacey, James A.: *See*—
Scarton, Henry A.; DiBianca, John A.; Lacey, James A.; and Kennedy, Warren C., 4,516,658, Cl. 181-208.000.
Lacour, Alain P.: *See*—
Ancher, Jean-Francois R.; Bourgery, Guy R.; Dostert, Philippe L.; Douzon, Colette A.; Guerret, Patrick G.; Lacour, Alain P.; and Langlois, Michel, 4,517,197, Cl. 514-376.000.
Laemmle, Joseph T.; and Bohaychick, John, to Aluminum Company of America. Metalworking lubricant composition containing a novel substituted malonic acid diester. 4,517,105, Cl. 252-56.00R.
Laing, Karsten; Laing, Oliver; and Ludin, Ludwig. Pressureless large-area heating system. 4,516,721, Cl. 237-69.000.
Laing, Oliver: *See*—
Laing, Karsten; Laing, Oliver; and Ludin, Ludwig, 4,516,721, Cl. 237-69.000.
Lalor, Leo J.: *See*—
Kaljee, Jan; Lalor, Leo J.; Pagani, Sergio M.; and Robinson, Frederick P. A., 4,517,441, Cl. 219-146.230.
Lamb Technicon Corp.: *See*—
Brems, John H.; and Vaphiadis, John L., 4,516,504, Cl. 104-130.000.
Lambert, Francois; and Val, Christian. Process for polymerizing thermosetting resins. 4,517,356, Cl. 528-483.000.
Lambert, Phillip E. Wheeled push rake. 4,516,393. Cl. 56-400.200.
Lambertson, William A. Rotary motion damping means. 4,516,667, Cl. 188-82.340.
Lamond, Lee T. Flexible plumbing trap. 4,516,278, Cl. 4-191.000.
Lampert, Friedrich-Karl: *See*—
Luhmann, Erhard; Hoppe, Lutz; Szablikowski, Klaus; and Lampert, Friedrich-Karl, 4,517,324, Cl. 524-27.000.
Lance, Clyde E.; and Hutchison, Wanda S., to United States of America, Army. Variable optical attenuator. 4,516,827, Cl. 350-96.150.
Lance, Joseph R., to Westinghouse Electric Corp. Air motor drive for fuel cell power plant air circulator. 4,517,259, Cl. 429-26.000.
Landheer, Dolf: *See*—
Maczuszenko, Andrzej; Davison, Ernest; Otter, Brian; Whittaker, Brian F.; Novak, Christopher; and Landheer, Dolf, 4,516,847, Cl. 355-3.0TR.
Lang, Gerard: *See*—
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,517,174, Cl. 424-62.000.
Lang, Robert L.: *See*—
May, Joseph R.; Petruccelli, Frank; Lang, Robert L.; and de Haan, Herman P., 4,517,231, Cl. 428-35.000.
Langenegger, Urs; Roffler, Werner; and Rutsche, Wendolin, to Embru-Werke, Mantel & Cie. Office furniture with an adjustable tabletop in modular design for setup at the work place. 4,516,509, Cl. 108-147.000.
Langer, Frantisek: *See*—
Valasek, Miloslav; Langer, Frantisek; Hradek, Jaroslav; and Seeman, Jindrich, 4,517,457, Cl. 250-239.000.
Langlitz, Karlheinz; and Schmitz, Gunter, to Mannesmann Aktiengesellschaft. Tiltable metallurgical converter having material carrying lines. 4,516,757, Cl. 266-245.000.
Langlois, Michel: *See*—
Ancher, Jean-Francois R.; Bourgery, Guy R.; Dostert, Philippe L.; Douzon, Colette A.; Guerret, Patrick G.; Lacour, Alain P.; and Langlois, Michel, 4,517,197, Cl. 514-376.000.
Langner, Carl: *See*—
Poran, Michael; Langner, Carl; and Tobiasz, Chester C., 4,516,624, Cl. 164-418.000.
Largeteau, Pierre A., to S.A. Automobiles Citroen; and Societe Automobiles Peugeot. Grinding machine. 4,516,359, Cl. 51-349.000.
Lasher, Dana A.; and Stelzenmuller, William K., to International Business Machines Corporation. Method for reducing line width variations in bilevel video images. 4,517,604, Cl. 358-262.000.
Laskaris, Evangelos T., to General Electric Company. Foam filled insert for horizontal cryostat penetrations. 4,516,404, Cl. 62-45.000.
Laskaris, Evangelos T., to General Electric Company. Supporting tie configuration for cryostat for cold shipment of NMR magnet. 4,516,405, Cl. 62-55.000.
Laspa, Matti: *See*—
Kela, Heino; and Laspa, Matti, 4,516,732, Cl. 241-24.000.
Laster, Walter R., to Borg-Warner Corporation. Power transmission chain-belt. 4,516,964, Cl. 474-245.000.
Latta, Milton R.: *See*—
Jain, Kantilal; and Latta, Milton R., 4,516,832, Cl. 350-96.240.
Lau, Alfred T. Y.: *See*—
Chow, Kwong-Wai; Lau, Alfred T. Y.; Chow, Ming-Ngar; and Lee, James S. W., 4,516,954, Cl. 446-461.000.
Launder, Richard L. Attachment assembly for excavation teeth. 4,516,340, Cl. 37-142.00A.
Laurel Bank Machine Co., Ltd.: *See*—
Kokubo, Eiichi; Arikawa, Junichi; Goi, Kowichi; and Imura, Shinichi, 4,517,451, Cl. 235-379.000.
Laurence, Roger F., to Reynolds & Laurence Industries Limited. Hearing aids. 4,517,415, Cl. 179-107.0FD.
LaVoie, Robert E.: *See*—
Agron, Michael H.; Buch, James R.; and LaVoie, Robert E., 4,517,557, Cl. 340-540.000.
Lawn, Richard M.: *See*—
Bock, Susan C.; and Lawn, Richard M., 4,517,294, Cl. 435-70.000.
Lawrence, Merlin, to Automated Industrial Systems. Laser marker for articles of manufacture. 4,517,436, Cl. 219-121.0LH.
Lawson, John E.; Matier, William L.; and Roth, Herbert R., to Mead Johnson & Company. 1-Pyrimidinyloxy-3-hetaryl-alkylamino-2-propanols. 4,517,188, Cl. 514-394.000.

Le Materiel de Voirie, Sarl: *See—*
Pineau, Jean, 4,516,285, Cl. 15-84.000.

Le, Tri C.: *See—*
Babbitt, Brett A.; and Le, Tri C., 4,516,752, Cl. 251-214.000.

Lechopier, Serge: *See—*
Berte , Marc; Bidard, Louis; and Lechopier, Serge, 4,517,485, Cl. 310-320.000.

Lee, James S.: *See—*
Chow, Kwong-Wai; Lau, Alfred T. Y.; Chow, Ming-Ngar; and Lee, James S. W., 4,516,954, Cl. 446-461.000.

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Lee, Patrick G.; Bean, Donald E.; and Jones, Randy T., to Sperry Corporation. Radar trigger and pretrigger generator having delay sensing and compensating circuit. 4,517,567, Cl. 343-17.700.

Leeper, Marvin A.; Turner, Richard L.; and Simpkins, Terry J., to Midmark Corporation. Multi-position examination chair. 4,516,805, Cl. 297-330.000.

Leineweber, Gunter: *See—*
Warnecke, Rolf; Ruhmer, Heinz; and Leineweber, Gunter, 4,516,470, Cl. 91-374.000.

Leistner, Gerhard; Muller, Gerhard; Sell, Gunther; and Bauer, Alexander, to Hoechst Aktiengesellschaft. Process for the biological purification of waste water. 4,517,093, Cl. 210-629.000.

Leitgeb, Wilhelm; and Schonwald, Siegfried, to Siemens Aktiengesellschaft. Compressor arrangement for a heat pump installation. 4,516,912, Cl. 417-45.000.

Leitman, Ervin. Tabulated sheet protectors. 4,516,871, Cl. 402-79.000.

Le Magourou, Yves, to Societe d'Exploitation des Procedes Marechal. Make and break electrical connector. 4,516,819, Cl. 339-46.000.

Lenke, Dieter: *See—*
Schlecker, Rainer; Friedrich, Ludwig; and Lenke, Dieter, 4,517,196, Cl. 514-371.000.

Lenker, Don H.; and Nascimento, Dennis F., to United States of America, Agriculture. Wrapping machine. 4,516,385, Cl. 53-504.000.

Lennartz, Rudiger: *See—*
Romey, Ingo; and Lennartz, Rudiger, 4,517,086, Cl. 210-323.200.

Lenox Machine Company, Inc.: *See—*
Snygg, Keijo K., 4,516,735, Cl. 242-56.00R.

Leppard, David G.; and Rody, Jean, to Ciba-Geigy AG. Color-photographic recording material. 4,517,283, Cl. 430-512.000.

Lergier, William: *See—*
Felix, Arthur M.; Gillessen, Dieter; Lergier, William; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,517,119, Cl. 260-112.50R.

Les Cables de Lyon: *See—*
Guazzo, Lucien, 4,516,830, Cl. 350-96.220.

Les Robinets Presto: *See—*
Patient, Lucien, 4,516,607, Cl. 137-637.400.

Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. 5-Alkyl-1,6-naphthyridin-2(1H)-ones and cardiotonic use thereof. 4,517,190, Cl. 514-300.000.

Lesher, George Y., to Sterling Drug Inc. 6-Alkyl-5-[4-(alkylsulfinyl or alkylsulfonyl)phenyl]-2(1H)-pyridinones and their use as cardiatonics. 4,517,192, Cl. 514-345.000.

Le Trung, Do: *See—*
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,517,174, Cl. 424-62.000.

Leu, Beat: *See—*
Mittelmeier, Heinz; Moser, Heinz; and Leu, Beat, 4,516,276, Cl. 3-1.910.

Leung, Tak L.: *See—*
Fotiadis, Emanuel; Kozol, Edward J.; Leung, Tak L.; and Paul, Robert J., 4,516,678, Cl. 206-444.000.

Lever Brothers Company: *See—*
Clarke, Terence A.; Edwards, Richard B.; and Irving, Graeme N., 4,517,107, Cl. 252-108.000.

Levine, Lawrence W.; and Mullins, Carolyn C., to Carlin Foods Corporation. Process for making a fried fruit filling composition-containing food product. 4,517,203, Cl. 426-19.000.

Levis, William W., Jr.: *See—*
Korczak, Alexander; and Levis, William W., Jr., 4,517,383, Cl. 564-443.000.

Levy, Paul M. Television system. 4,517,592, Cl. 358-92.000.

Lewis, Carol R., to Varian Associates, Inc. Metal-containing organic photoresists. 4,517,276, Cl. 430-192.000.

Lewis, Edwin C.; Henschenmacher, Helmut; Ecker, Karl-Heinz; Giernalczyk, Hartmut; and Rutte, Siegfried. Closure for openings in pumps. 4,516,477, Cl. 92-128.000.

Lewis, James D. Apparatus for operational analysis of computers. 4,517,671, Cl. 371-19.000.

Leybold-Heraeus GmbH: *See—*
Fauser, Friedrich; and Fischer, Willi, 4,517,057, Cl. 202-205.000.

Leyrer, Reinhold J.: *See—*
Graser, Fritz; Hoffmann, Gerhard; Leyrer, Reinhold J.; Neumann, Peter; and Patsch, Manfred, 4,517,270, Cl. 430-58.000.

LGZ Landis & Gyr Zug AG: *See—*
Neyer, Norbert, 4,517,682, Cl. 375-106.000.

Liberman, Moysey. Apparatus and method for producing article shapes from a composite material. 4,516,626, Cl. 164-461.000.

Lickle, Brett D.: *See—*
Hobbs, Andrew G. P., Jr.; Lickle, Brett D.; and Hobbs, Patricia W., 4,516,409, Cl. 62-457.000.

Lifshitz, Ifim: *See—*
Lifshitz, Igor; and Lifshitz, Ifim, 4,516,923, Cl. 425-289.000.

Lifshitz, Igor; and Lifshitz, Ifim. Food press forms. 4,516,923, Cl. 425-289.000.

Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, to International Flavors & Fragrances Inc. Process for producing solanone, norsolanadione and intermediates therefor. 4,517,385, Cl. 568-386.000.

Lighthouse for the Blind, Incorporated, The: *See—*
Johnson, Robert S.; Fletcher, Paul E.; Benjamin, William S.; and Zsitvay, John I., 4,516,287, Cl. 15-119.00A.

Lihl, Reinhard: *See—*
Kappl, Gerhard; Kranner, Helmut; and Lihl, Reinhard, 4,516,459, Cl. 83-713.000.

Lin, Frank W.; Moon, Suhdok D.; Van, Tri S.; and Anzai, Max I., to Mechatron Systems, Inc. Method and apparatus for normalizing the speed of an element positionable by a servomechanism. 4,517,503, Cl. 318-561.000.

Lindberg, John E., to Owen, Wickersham & Erickson. Combustion and pollution control system. 4,516,553, Cl. 123-568.000.

Linde Aktiengesellschaft: *See—*
Rebhan, Dieter, 4,516,878, Cl. 405-130.000.

Lindert, Andreas, to Parker Chemical Company. Treatment of metal with derivative of poly-alkenylphenol. 4,517,028, Cl. 148-6.14R.

Lindstedt, Guenter; and Nopper, Guido H., to ITT Industries, Inc. Digital phase/frequency control circuit. 4,517,529, Cl. 331-1.00A.

Ling, Nicholas C.; Esch, Frederick S.; Bohlen, Peter; Brazeau, Paul E., Jr.; and Guillemin, Roger C. L., to Salk Institute for Biological Studies, The. Mammalian PGRF. 4,517,181, Cl. 514-12.000.

Lion Corporation: *See—*
Ando, Hideo; Kiyama, Kentaro; and Kitano, Kyozo, 4,517,113, Cl. 252-353.000.

Litchfield, William J.: *See—*
Freytag, J. William; and Litchfield, William J., 4,517,303, Cl. 436-501.000.

Liu, Raymond C.; and Markle, David A., to Perkin-Elmer Corp., The. Method and apparatus for measuring intensity variation in a light source. 4,516,852, Cl. 356-121.000.

Liu, Yet-Zen; and Hong, Chi-Shain, to United States of America, Navy. Zinc-diffused narrow stripe AlGaAs/GaAs double heterostructure laser. 4,517,674, Cl. 372-45.000.

Loch, David M.; and Henkes, Dale D., to Boeing Company, The. Automated alternating polarity direct current pulse electrolytic processing of metals. 4,517,059, Cl. 204-14.100.

Loch, Karl: *See—*
Haacke, Harri; and Loch, Karl, 4,516,429, Cl. 73-638.000.

Lochon, Henri: *See—*
Bourgeois, Serge; Carle, Jean-Franqois; Lochon, Henri; and Trotin, Jean-Pierre, 4,516,525, Cl. 118-688.000.

Lockhart, Thomas P.; and Wengrovius, Jeffrey H., to General Electric Company. Room temperature vulcanizable organopolysiloxane compositions and method for making. 4,517,337, Cl. 524-859.000.

Lockheed Corporation: *See—*
Frink, Attila; and Morrison, Robert A., 4,517,625, Cl. 361-399.000.

Loeslein, Raymond D.: *See—*
Venable, Thomas L.; Robinson, Geoffrey C.; and Loeslein, Raymond D., 4,516,815, Cl. 339-14.00R.

Lonati, Francesco, to Lonati S.p.A. Knitwork drawing device in a double cylinder circular knitting machine. 4,516,410, Cl. 66-14.000.

Lonati S.p.A.: *See—*
Lonati, Francesco, 4,516,410, Cl. 66-14.000.

Longi, Paolo: *See—*
Cuffiani, Illaro; Longi, Paolo; Zucchini, Umberto; and Pennini, Gianni, 4,517,307, Cl. 502-119.000.

Lord Corporation: *See—*
Beaton, Brian M., 4,516,476, Cl. 92-59.000.

Loroco Industries, Inc.: *See—*
Curro, Dominic, Jr., 4,516,892, Cl. 410-155.000.

Lossack, Edgar: *See—*
Merchant, Harish D.; and Lossack, Edgar, 4,517,034, Cl. 148-439.000.

Lotito, Vincent; and Fletcher, Stephen R. Aquarium. 4,516,529, Cl. 119-5.000.

Lucas Chloride EV Systems Limited: *See—*
Ridout, Paul S.; and Birks, Colin, 4,517,585, Cl. 357-81.000.

Lucas, Gary M.: *See—*
White, Mary A.; Beers, Melvin D.; Lucas, Gary M.; Smith, Robert A.; and Swiger, Roger T., 4,517,352, Cl. 528-18.000.

Lucas Industries public limited company: *See—*
Tarplee, Michael K., 4,516,400, Cl. 60-535.000.
Williams, Derek, 4,516,547, Cl. 123-198.00A.

Ludenbach, Karl; and Huhn, Erhard, to Dienes Werke fur Maschinenteile GmbH & Co. KG. Disc valve. 4,516,602, Cl. 137-512.150.

Ludin, Ludwig: *See—*
Laing, Karsten; Laing, Oliver; and Ludin, Ludwig, 4,516,721, Cl. 237-69.000.

Ludman, Jacques E. Interferometric angular measurement system. 4,516,854, Cl. 356-363.000.

Luhmann, Erhard; Hoppe, Lutz; Szablikowski, Klaus; and Lampert, Friedrich-Karl, to Bayer Aktiengesellschaft. Viscous cellulose-containing mixture (paste) and a process for the production of aqueous coating emulsions therefrom. 4,517,324, Cl. 524-27.000.

Lund, Arnold M. Core chuck. 4,516,786, Cl. 279-2.00R.

Lundberg, Robert D.; Phillips, Robert R.; and Peiffer, Dennis G., to Exxon Research and Engineering Co. Novel viscosifiers for aqueous fluids based on polymer complexes. 4,517,333, Cl. 524-516.000.

Lundberg, Robert D.: *See*—
Agarwal, Pawan K.; Lundberg, Robert D.; Wagensomer, Joseph; and Jagisch, Frank C., 4,517,250, Cl. 428-483.000.
Duvdevani, Ilan; Peiffer, Dennis G.; Eckert, John A.; and Lundberg, Robert D., 4,516,982, Cl. 44-62.000.

Luneberg, Hartmut: *See*—
Ritt, Hans-Georg; Luneberg, Hartmut; Mannl, Reinhard; and Grillmeier, Alfred, 4,516,998, Cl. 65-108.000.

Lurz, Werner, to Messerschmitt-Bolkow-Blohm GmbH. Method of and apparatus for controlling the boundary layer flow over the surface of a body. 4,516,747, Cl. 244-204.000.

Lynch, John; Naarmann, Herbert; Schulz, Gunther; Vyvial, Rudolf; Wallbillich, Gunter; and Zurger, Manfred, to BASF Aktiengesellschaft. Photosensitive recording material suitable for the production of printing plates and relief plates, and the production of these plates using this recording material. 4,517,277, Cl. 430-281.000.

M.A.N. Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
Million, Karl; and Zimmermann, Horst, 4,517,434, Cl. 219-76.120.

M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft: *See*—
Holl, Roland, 4,517,221, Cl. 427-8.000.
Kobler, Ingo, 4,516,759, Cl. 270-12.000.

Mabrey, Theodore R.: *See*—
Straub, Albert M.; Mabrey, Theodore R.; and Vokovich, Daniel L., 4,517,614, Cl. 360-85.000.

Macarchenia, Joseph H.: *See*—
Ely, Duain N.; and Macarchenia, Joseph H., 4,516,745, Cl. 244-134.00A.

Machabert, Bernard: *See*—
Barriquand, Robert; Barriquand, Bernard; Durantet, Bernard; and Machabert, Bernard, 4,516,413, Cl. 68-5.00C.

Machino, Katsuyuki: *See*—
Ise, Masahiro; Machino, Katsuyuki; Tanaka, Hidehiko; and Matsubara, Toshiyuki, 4,517,548, Cl. 340-310.00R.

MacIntosh, John A.; and Zeigner, Willard L., to Zemco, Inc. Flow sensor. 4,516,433, Cl. 73-861.050.

MacMillan Bloedel Limited: *See*—
Churchland, Mark T., 4,517,148, Cl. 264-112.000.

MacPherson, David B.; Paris, Jay E.; Foley, Robert W.; Greinier, Martin W.; and Pulsifer, David N., to Eastern Company, The. Sewage treatment device. 4,516,281, Cl. 4-319.000.

Maczuszenko, Andrzej; Davison, Ernest; Otter, Brian; Whittaker, Brian F.; Novak, Christopher; and Landheer, Dolf, to Delphax Systems. Electrostatic printing apparatus and method. 4,516,847, Cl. 355-3.0TR.

Maddox, Jim, Jr., to Texaco Inc. Method of extracting and reutilizing surfactants from emulsions with sulfonated alkyl benzenes and alcohols. 4,516,635, Cl. 166-266.000.

Madison, David P.; and Cruver, Michael B. Apparatus for folding a dough sheet to enclose a foodstuff filler. 4,516,487, Cl. 99-450.600.

Maeda, Kiyoshi; and Okamoto, Masashi, to Dainippon Screen Manufacturing Co., Ltd. Image recording device. 4,517,608, Cl. 358-298.000.

Maeo, Hidemi: *See*—
Sato, Yoshito; Yato, Tokuhiro; Maeo, Hidemi; and Tsutsumi, Yoshio, 4,516,469, Cl. 91-362.000.

Maggis, Aldo: *See*—
Baldi, Livio; and Maggis, Aldo, 4,517,226, Cl. 427-90.000.

Magnavox Consumer Electronics Company: *See*—
Caspari, Fred W., 4,517,683, Cl. 375-117.000.

Magnetic Peripherals Inc.: *See*—
Hennenfent, Douglas J.; Holmstrand, Allan L.; and Kracke, Alan G., 4,517,041, Cl. 156-155.000.
Minuhin, Vadim B., 4,517,610, Cl. 360-24.000.

Magnusson, Karl G.; and Stahl, Hans V., to Saab-Scania Aktiebolag. Method of automatic gear selection in a vehicle power transmission. 4,517,646, Cl. 364-424.100.

Mahlkow, Hartmut: *See*—
Grapentin, Joachim; Mahlkow, Hartmut; and Skupsch, Jurgen, 4,517,254, Cl. 428-626.000.

Main, W. Eric: *See*—
Gray, Randall C.; and Main, W. Eric, 4,517,547, Cl. 340-59.000.

Maiter, Sigurd: *See*—
Brusis, Otto; Maiter, Sigurd; and Haufe, Paul, 4,517,621, Cl. 361-231.000.

Maki, Yoshiki: *See*—
Fujita, Daijiro; Motoo, Akihiko; and Maki, Yoshiki, 4,516,925, Cl. 425-463.000.

Malaval, Alain: *See*—
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,517,174, Cl. 424-62.000.

Male, Barry, to United Technologies Corporation. Capacitive pressure transducer signal conditioning circuit. 4,517,622, Cl. 361-283.000.

Mallinson, Ronald I., to Mono-Flo Lister Limited. Conduit. 4,516,533, Cl. 119-72.000.

Mallon, Joseph R.: *See*—
Kurtz, Anthony D.; Nunn, Timothy A.; and Mallon, Joseph R., 4,516,430, Cl. 73-727.000.

Malone, Charles: *See*—
Edwards, James D.; and Malone, Charles, 4,517,426, Cl. 200-38.00A.

Malone, Edgar W., to Reynolds Industries Inc. Capacitor discharge apparatus. 4,517,497, Cl. 315-241.00R.

Malphrus, Manley L. Fishing lure. 4,516,350, Cl. 43-17.600.

Mamei, Masayuki: *See*—
Yoshino, Tadashi; and Mamei, Masayuki, 4,516,740, Cl. 242-203.000.

Manabe, Sugio: *See*—
Galle, Kevin; Orimo, Ryoichi; Sakurada, Masahiko; Banno, Taiichi; and Manabe, Sugio, 4,517,160, Cl. 422-65.000.

Mangold, Helmut K.: *See*—
Muramatsu, Toshio; Totani, Nagao; and Mangold, Helmut K., 4,517,297, Cl. 435-128.000.

Mannesmann Aktiengesellschaft: *See*—
Haacke, Harri; and Loch, Karl, 4,516,429, Cl. 73-638.000.
Langlitz, Karlheinz; and Schmitz, Gunter, 4,516,757, Cl. 266-245.000.

Mannl, Reinhard: *See*—
Ritt, Hans-Georg; Luneberg, Hartmut; Mannl, Reinhard; and Grillmeier, Alfred, 4,516,998, Cl. 65-108.000.

Manome, Taichi; Ohmine, Toshinori; Okazaki, Takao; and Arai, Mamoru, to Sankyo Company, Limited. Plasmid pSAN 181. 4,517,300, Cl. 435-317.000.

Mantelet, Jean, to Cuisi-Technic S.a.r.l. Electric heating element, and a hot plate equipped with the heating element. 4,517,454, Cl. 219-455.000.

Mantellina, Calogero; and Zanzottera, Daniele, to Honeywell Information Systems Inc. Digital timing unit. 4,517,681, Cl. 375-106.000.

Marathon Oil Company: *See*—
Merrill, LaVaun S., Jr., 4,517,097, Cl. 210-696.000.

Mardis, Wilbur S.; and Finlayson, Claude M., to NL Industries, Inc. Modified organophilic clay complexes, their preparation and nonaqueous systems containing them. 4,517,112, Cl. 252-315.200.

Margolin, George D. Resilient deformable keyboard. 4,517,421, Cl. 200-1.00R.

Mariano, Armando: *See*—
Mercati, Giorgio; Mariano, Armando; Pertot, Fulvio; Glionna, Antonio; and Ferri, Mario, 4,517,355, Cl. 528-287.000.

Marinak, Michael J.; and Simonson, John L., to Kalama Chemical, Inc. Preparation of mixtures rich in 3,4,5,6-tetrachloro-2-trichloromethyl pyridine. 4,517,369, Cl. 546-345.000.

Marketing Displays, Inc.: *See*—
Seely, James R., 4,516,344, Cl. 40-602.000.

Markham, Peter G.; Townsend, Rodney; and Davies, Jeffrey W., to National Research Development Corporation. Method of combatting plant diseases. 4,517,177, Cl. 424-93.000.

Markle, David A.: *See*—
Liu, Raymond C.; and Markle, David A., 4,516,852, Cl. 356-121.000.

Marshall, Charles A.; and Ray, Jeremiah B. Catheter shield and method of use. 4,516,968, Cl. 604-174.000.

Marshall, Robert J.: *See*—
Alexander, Kenneth E.; and Marshall, Robert J., 4,517,629, Cl. 362-267.000.

Marsocci, Angelo A.; and Schuchard, Walter F., to American District Telegraph Co. Smoke detector with remote alarm indication. 4,517,555, Cl. 340-522.000.

Martelli, Daniele, to S.A.E.S. Getters S.p.A. Method to evenly heat an asymmetric getter device by induction. 4,516,945, Cl. 445-19.000.

Martin, Charles F. Underwater trenching apparatus. 4,516,880, Cl. 405-160.000.

Martin, Clyde J. Golf tees and ball marker assembly. 4,516,773, Cl. 273-32.00A.

Martin, Donald R., to McGraw-Edison Company. Self-flow generating gas interrupter. 4,517,425, Cl. 200-148.00A.

Martin, John C.; and Martin, Paul H., to Diesel Equipment Limited. Multi-part valve with a valve seat skeleton and cast valve body. 4,516,594, Cl. 137-15.000.

Martin, Paul H.: *See*—
Martin, John C.; and Martin, Paul H., 4,516,594, Cl. 137-15.000.

Martin, Raymond H.; Garganese, Ugo S.; and Griffin, John R. Custom denture fabrication technic. 4,517,043, Cl. 156-196.000.

Martin, Wayne A., to United States Steel Corporation. Method and apparatus for making single cranks for built-up crankshafts used in large engines. 4,516,299, Cl. 29-6.000.

Martinez, Felix J.: *See*—
Amiot, Bruce P.; Fuller, Larry E.; Martinez, Felix J.; Cosentino, Louis C.; Harm, William H.; and Nelson, Wayne I., 4,517,081, Cl. 210-85.000.

Martinez, Louis, to McGraw-Edison Company. FM Communication system. 4,517,562, Cl. 340-825.070.

Marton, George: *See*—
Marton, Miksa; and Marton, George, 4,516,358, Cl. 51-119.000.

Marton, Miksa; and Marton, George. Clutch assembly for sanding head. 4,516,358, Cl. 51-119.000.

Maruzen Oil Company, Limited: *See*—
Fujiwara, Hiroshi; Yamazaki, Hatsutaro; and Ozawa, Kazuo, 4,517,349, Cl. 526-313.000.

Masaki, Mikio: *See*—
Kobayashi, Satoru; Masaki, Mikio; Sakuno, Hideaki; Shimizu, Keiichi; and Fukasawa, Takeshi, 4,516,415, Cl. 70-252.000.

Masaki, Nobuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Compact conductor device. 4,517,405, Cl. 174-68.00B.

Masao, Yamamoto: *See*—
Hirobumi, Saito; Kiyoshi, Ito; Kaichi, Higuchi; and Masao, Yamamoto, 4,516,944, Cl. 441-40.000.

Maschinenfabrik Fr. Niepmann GmbH & Co.: *See*—
Iain, Stewart, 4,516,379, Cl. 53-138.00A.

Maska, Rudolf: *See*—
Birkmeyer, William J.; Gray, Ralph C.; Dowbenko, Rostyslaw; Kapp, David C.; VanBuskirk, Elfor J.; and Maska, Rudolf, 4,517,322, Cl. 523-501.000.

Mason, James W., to Dasurat Enterprises PTE Ltd. Porous irrigation pipe prepared from particulate elastomer and thermoplastic binder containing controlled moisture content. 4,517,316, Cl. 521-81.000.

Massey, Charles R. Shaft alignment device. 4,516,328, Cl. 33-181.00R.

Massey-Ferguson-Perkins Limited: *See—*
Brear, Frederick, 4,516,549, Cl. 123-276.000.

Masten, Billy R.: *See—*
Benitez, Willie B., III; and Masten, Billy R., 4,517,455, Cl. 235-463.000.

Masuda, Hitoshi: *See—*
Sekine, Kunio; Masuda, Hitoshi; Ishibashi, Kodo; Hirai, Masahide; Tomoshige, Shozo; and Kondo, Kozo, 4,517,096, Cl. 210-668.000.

Masuda, Jiro: *See—*
Tanigawa, Kou; Masuda, Jiro; Nakamura, Kazumasa; and Hayashi, Kazuhiko, 4,516,652, Cl. 180-177.000.

Masuda, Michio: *See—*
Aizawa, Iwao; and Masuda, Michio, 4,517,587, Cl. 358-17.000.

Masumoto, Hakaru; and Nakamura, Naoji, to Foundation: The Research Institute of Electric and Magnetic Alloys, The. Electrical resistant alloys having a small temperature dependence of electric resistance over a wide temperature range and a method of producing the same. 4,517,156, Cl. 420-463.000.

Masumoto, Kazuhiro; Fujimura, Mituaki; and Sawazaki, Masauki, to Mitsui Petrochemical Industries, Ltd.; and Yazaki Plastics Industries Co., Ltd. Method for molding hollow blow-molded articles. 4,517,151, Cl. 264-540.000.

Masumoto, Norio: *See—*
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, 4,517,087, Cl. 210-396.000.

Masuno, Katsuyoshi; and Kamata, Tsutomu, to Mitsubishi Denki Kabushiki Kaisha. Ignition apparatus for internal combustion engine. 4,516,557, Cl. 123-619.000.

Matayoshi, Yutaka: *See—*
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.

Matcovich, Charles: *See—*
D'Alessio, Michael; and Matcovich, Charles, 4,516,663, Cl. 187-19.000.

Matejka, Robert C.; and Moretz, Nellie M., to Reliance Universal, Inc. Pigmented prepress coatings for composition board. 4,517,228, Cl. 427-370.000.

Mathias, Jean M.: *See—*
Kersten, Jean; and Mathias, Jean M., 4,517,090, Cl. 210-493.200.

Matier, William L.: *See—*
Lawson, John E.; Matier, William L.; and Roth, Herbert R., 4,517,188, Cl. 514-394.000.

Matoba, Isao: *See—*
Goto, Tomomichi; Iwamoto, Katsuo; Kobayashi, Yoshinori; and Matoba, Isao, 4,517,032, Cl. 148-111.000.

Matson, Donald F., to Western AG-Sales Inc. Bumper apparatus for low bed trailer. 4,516,902, Cl. 414-480.000.

Matsubara, Toshiyuki: *See—*
Ise, Masahiro; Machino, Katsuyuki; Tanaka, Hidehiko; and Matsubara, Toshiyuki, 4,517,548, Cl. 340-310.00R.

Matsumoto, Seiichi: *See—*
Suzuki, Ryoichi; Matsumoto, Seiichi; Amikura, Takashi; Tsunekawa, Tokuichi; and Uchiyama, Takashi, 4,516,835, Cl. 350-336.000.

Matsumura, Shunichi; and Inata, Hiroo, to Teijin Limited. Production of a film-like or fibrous structure of an aromatic polyester. 4,517,315, Cl. 521-64.000.

Matsunaga, Fujihisa; Nishimura, Tadahiko; Miyake, Etsuo; and Banba, Kiyotaka, to Mitsui Petrochemical Industries, Ltd.; and Honshu Chemical Ind. Co. Ltd. Process for production of 2,2-bis(4-hydroxyphenyl) propane. 4,517,387, Cl. 568-728.000.

Matsuno, Kenji; and Funamoto, Hiroyuki, to Toyo Seikan Kaisha, Limited. Welded can bodies. 4,517,256, Cl. 428-629.000.

Matsuoka, Kazuhiko: *See—*
Baba, Takeshi; and Matsuoka, Kazuhiko, 4,517,589, Cl. 358-75.000.

Matsuoka, Shunji: *See—*
Okamoto, Kenji; Nishiwaki, Yoshikazu; Matsuoka, Shunji; and Nishiura, Yozo, 4,517,280, Cl. 430-321.000.

Matsushima, Kazufumi, to Tokyo Shibaura Denki Kabushiki Kaisha. Menu display device. 4,517,428, Cl. 219-10.55B.

Matsushita Electric Industrial Co., Ltd.: *See—*
Funagura, Shuichi; and Nishio, Katsufumi, 4,516,733, Cl. 241-79.000.
Kakimoto, Atsushi; and Takita, Masaaki, 4,517,575, Cl. 346-138.000.
Neki, Shigeo; Shinozaki, Nozomu; and Morofuji, Takeshi, 4,516,514, Cl. 112-275.000.
Shibaike, Narito; Minamide, Seiko; Kikuya, Satoshi; Terada, Hiroshi; and Zaitsu, Osamu, 4,517,613, Cl. 360-85.000.
Ueda, Shigeki, 4,517,431, Cl. 219-10.55B.
Yoshino, Tadashi; and Mamei, Masayuki, 4,516,740, Cl. 242-203.000.

Matsushita, Yasuo; Nakamura, Kousuke; and Ura, Mitsuru, to Hitachi, Ltd. Ceramic packaged semiconductor device. 4,517,584, Cl. 357-80.000.

Matsuyama, Kiyoshi; Ochi, Kenji; Ogawa, Hiroyuki; Suzaki, Takuya; and Imai, Kazuyoshi, to Sumitomo Chemical Company, Limited. Particulate polyolefin molding material. 4,517,246, Cl. 428-407.000.

Mattel, Inc.: *See—*
Hippely, Keith A.; and Goldstein, Samuel M., 4,516,953, Cl. 446-444.000.

Matthaei, Horst D.: *See—*
Bohg, Armin; Matthaei, Horst D.; and Hartmann, Kurt, 4,517,538, Cl. 335-272.000.

Matychowiak, David S.: *See—*
Beaulieu, Roger D.; Alcorn, William W.; and Matychowiak, David S., 4,516,363, Cl. 52-90.000.

Maurer, Alexander: *See—*
Merkenich, Karl; Wasel-Nielen, Horst-Dieter; Maurer, Alexander; and Adrian, Renate, 4,517,109, Cl. 252-135.000.

May & Baker Limited: *See—*
Bird, Clive W.; Butler, Helene I.; Caton, Michael P. L.; Coffee, Edward C. J.; Darnbrough, Geoffrey; and Hart, Terance W., 4,517,202, Cl. 514-530.000.

May, David A.: *See—*
Gardner, Bruce C.; Ingold, Daniel L.; and May, David A., 4,516,618, Cl. 160-120.000.

May, Joseph R.; Petruccelli, Frank; Lang, Robert L.; and de Haan, Herman P., to Allied Corporation. Hollow enclosed seamless polymeric article containing a baffle. 4,517,231, Cl. 428-35.000.

May, Michael G. Ignition device for improving the efficiency of and to reduce emissions of internal combustion engines. 4,516,548, Cl. 123-260.000.

May, Roderick G.: *See—*
Clark, Duncan G. D.; Kimber, Ian D.; and May, Roderick G., 4,517,679, Cl. 375-37.000.

Mayer, Richard T.: *See—*
DeLoach, John R.; Harris, Robert L.; Mayer, Richard T.; and Ihler, Garret M., 4,517,080, Cl. 210-85.000.

Mayer, Rothkopf Industries, Inc.: *See—*
Quay, Earl R., 4,516,292, Cl. 19-112.000.

Mayston, Donald: *See—*
Elworthy, John H.; and Mayston, Donald, 4,517,036, Cl. 156-64.000.

Mazda Motor Corporation: *See—*
Choushi, Masahiro; and Yahiro, Tetsuji, 4,516,546, Cl. 123-195.00A.

McBride, Donald G.: *See—*
Gazdik, Charles E.; and McBride, Donald G., 4,517,051, Cl. 156-644.000.

McClellan, Thomas R.; and Murray, Pat L., to Upjohn Company, The. Apparatus for coating particulate material. 4,516,524, Cl. 118-683.000.

McClung, Charles S.: *See—*
Rainer, Norman B.; and McClung, Charles S., 4,516,589, Cl. 131-331.000.

McClung, James A.: *See—*
Bulso, Joseph D., Jr.; Doyle, Stephen D.; and McClung, James A., 4,516,420, Cl. 72-329.000.

McCoy, Donald G. Securement means. 4,516,295, Cl. 24-136.00R.

McCrary, Thomas J., Jr.: *See—*
Bloch, Ricardo; McCrary, Thomas J., Jr.; and Brownawell, Darrell W., 4,517,104, Cl. 252-51.50A.

McDermott, Kevin. Portable lighting device. 4,517,628, Cl. 362-186.000.

McDonald, Quentin H.; Montalbano, Anthony P.; and Sieczkowski, Philip, to McDonald, Quentin H. Portable infant carrier. 4,516,806, Cl. 297-457.000.

McDougal, John A. Spiral windings. 4,517,540, Cl. 336-205.000.

McFarland, Melvin D.: *See—*
Ferrell, Philip J.; Stern, Alan D.; and McFarland, Melvin D., 4,517,639, Cl. 364-186.000.

McFarland, Roger A.: *See—*
Ferguson, Larry W.; and McFarland, Roger A., 4,517,323, Cl. 523-514.000.

McGhie, Joseph A.: *See—*
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.

McGraw-Edison Company: *See—*
Martin, Donald R., 4,517,425, Cl. 200-148.00A.
Martinez, Louis, 4,517,562, Cl. 340-825.070.
Spaunhorst, Vernon R., 4,517,544, Cl. 337-164.000.

McGregor, David J.: *See—*
Chyz, George W.; and McGregor, David J., 4,516,957, Cl. 464-111.000.

McLean, Kenneth W., to Sperry Corporation. Light hay baffle for disc mower-conditioner. 4,516,391, Cl. 56-16.400.

McLean, Kenneth W.; and Hale, John K., to Sperry Corporation. Conditioning roll drive mechanism. 4,516,392, Cl. 56-16.400.

McMahon, Donald H.: *See—*
Soref, Richard A.; and McMahon, Donald H., 4,516,837, Cl. 350-347.00V.

McManus, James W.: *See—*
Winckler, Elmer, 4,516,637, Cl. 166-377.000.

McMaster, Ronald A., to Glasstech, Inc. Apparatus for bending glass sheets. 4,517,001, Cl. 65-273.000.

Mead Johnson & Company: *See—*
Lawson, John E.; Matier, William L.; and Roth, Herbert R., 4,517,188, Cl. 514-394.000.

Mechatron Systems, Inc.: *See—*
Lin, Frank W.; Moon, Suhdok D.; Van, Tri S.; and Anzai, Max I., 4,517,503, Cl. 318-561.000.

Medtech Plastics, Inc.: *See—*
Kintner, Michael H., 4,516,969, Cl. 604-187.000.

Meeker, Brian L.; Ferguson, John W.; and Werner, Henry G., to Fiber-Lite Corporation. Fibrous product. 4,517,236, Cl. 428-192.000.

Meienhofer, Johannes A.: *See*—
Felix, Arthur M.; Gillessen, Dieter; Lergier, William; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,517,119, Cl. 260-112.50R.

Meighen, Terrence: *See*—
Brennan, Robert J.; and Meighen, Terrence, 4,516,825, Cl. 339-143.00R.

Meijer, Wilhelmus, to Xerox Corporation. Low-wire sensor. 4,516,713, Cl. 227-2.000.

Meinig, Manfred, to Karl Meinig, KG. Flanged ring for tubes. 4,516,797, Cl. 285-405.000.

Meinzer, Richard A.; and Dobbs, Gregory M., to United Technologies Corporation. Multi-species, CW combustion driven laser employing hydrogen bromide. 4,517,676, Cl. 372-89.000.

Meistring, Rolf; Siegling, Hans-Friedrich; and Pfahl, Siegfried, to Heermann GmbH. Light conducting cable including a heat removable layer for preventing tension and a method of making same. 4,516,831, Cl. 350-96.230.

Melcher, Domenic. Switched mode power supply with a plurality of regulated secondary outlets. 4,517,633, Cl. 363-21.000.

Memorex Corporation: *See*—
Bischoff, Peter G., 4,517,616, Cl. 360-126.000.

Mercati, Giorgio; Mariano, Armando; Pertot, Fulvio; Glionna, Antonio; and Ferri, Mario, to Anic S.p.A. Flameproof linear polyester, a process for its preparation, and articles formed from said polyester. 4,517,355, Cl. 528-287.000.

Merchant, Harish D.; and Lossack, Edgar, to Continental Can Company. Strip cast aluminum alloy suitable for can making. 4,517,034, Cl. 148-439.000.

Merck & Co., Inc.: *See*—
Johnston, David B. R., 4,517,186, Cl. 514-255.000.
Shim, Jaewon L., 4,517,216, Cl. 426-573.000.

Mercurio, Frank: *See*—
Berger, Hans S.; Mercurio, Frank; and Reiner, Norbert L., 4,516,648, Cl. 180-6.660.

Merkenich, Karl; Wasel-Nielen, Horst-Dieter; Maurer, Alexander; and Adrian, Renate, to Hoechst Aktiengesellschaft. Process for making mixed granulates from condensed phosphates and builder salts. 4,517,109, Cl. 252-135.000.

Merrill, LaVaun S., Jr., to Marathon Oil Company. Process for diluting aqueous polymer solutions. 4,517,097, Cl. 210-696.000.

Merten, Rudolf: *See*—
Zecher, Wilfried; Merten, Rudolf; and Dunwald, Willi, 4,517,353, Cl. 528-45.000.

Merz, Johann, to Zahnradfabrik Friedrichshafen AG. Seal assembly with radially undulated sealing element. 4,516,784, Cl. 277-180.000.

Merz, Kenneth M., to TRW Inc. Thick film temperature sensitive device and method and material for making the same. 4,517,545, Cl. 338-25.000.

Messerschmidt-Bolkow-Blohm GmbH: *See*—
Fuhring, Heinrich, 4,517,467, Cl. 290-44.000.

Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See*—
Altmann, Konrad, 4,517,677, Cl. 372-99.000.

Messerschmitt-Bolkow-Blohm GmbH: *See*—
Held, Manfred; and Grossler, Peter, 4,516,501, Cl. 102-496.000.
Lurz, Werner, 4,516,747, Cl. 244-204.000.

Metex Corporation: *See*—
Usher, Peter P., 4,516,782, Cl. 277-1.000.

Methven, Robert W. Ballast apparatus for righting a capsized boat. 4,516,516, Cl. 114-39.000.

Meulenbrugge, Hendrik J.; and Fortuin, Harm, to U.S. Philips Corporation. Method of calibrating a gamma camera, and a gamma camera including a calibration device. 4,517,460, Cl. 250-252.100.

Meyer, Howard E., to Heat Exchange and Transfer, Inc. Fuel preheater. 4,516,556, Cl. 123-557.000.

Michno, Michael J., Jr.: *See*—
Gardner, Hugh C.; Michno, Michael J., Jr.; and Brode, George L., 4,517,321, Cl. 523-400.000.

Micro Component Technology, Inc.: *See*—
Petrich, Dennis M.; Amick, Christopher G.; and Gruenenwald, Stanley L., 4,517,512, Cl. 324-73.00R.

Midmark Corporation: *See*—
Leeper, Marvin A.; Turner, Richard L.; and Simpkins, Terry J., 4,516,805, Cl. 297-330.000.

Migliori, Albert: *See*—
Swift, Gregory W.; Migliori, Albert; and Wheatley, John C., 4,516,632, Cl. 165-167.000.

Mihara, Shin-ichi: *See*—
Nakahashi, Ken-ichi; and Mihara, Shin-ichi, 4,516,840, Cl. 350-515.000.

Milani, John C.: *See*—
Eastridge, Victor R.; and Milani, John C., 4,516,587, Cl. 131-256.000.

Miles, Frank, to Tektronix, Inc. Oscilloscope trigger circuit combining wideband trigger signal amplification and trigger coupling mode selection. 4,517,523, Cl. 330-126.000.

Miles Laboratories, Inc.: *See*—
Greene, Carmine M., 4,517,301, Cl. 436-14.000.

Milford, Edgar L.; Carpenter, Charles B.; and Paradysz, Jean M., to Brigham and Women's Hospital. Monoclonal antibodies for human tissue cross-matching. 4,517,289, Cl. 435-7.000.

Miller, Dye O., to A. J. Antunes & Co. Device for cooking food. 4,516,485, Cl. 99-339.000.

Miller, Gardner H., to Trustroke International, Inc. Golf training aid. 4,516,779, Cl. 273-186.00C.

Miller, Granville G.: *See*—
Ivory, Dawn M.; Miller, Granville G.; Chance, Ronald R.; and Baughman, Ray H., 4,517,116, Cl. 252-500.000.

Miller, John E.; and Fortino, Dennis J., to Chromium Corporation. Piston with a controlled expansion piston anti-extrusion ring. 4,516,785, Cl. 277-188.00A.

Miller, Lee E.; Carr, Dennis D.; and Smith, Donald L., to Eagle-Picher Industries, Inc. Lightweight metal-hydrogen cell with improved plate stack supporting means. 4,517,264, Cl. 429-163.000.

Miller, Robert W. Method of repairing ballistic damage. 4,517,038, Cl. 156-98.000.

Miller, Wendell R., to Quantum Systems Corporation. Filtering apparatus. 4,517,088, Cl. 210-411.000.

Million, Karl; and Zimmermann, Horst, to M.A.N. Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Method and apparatus for manufacturing a tube bend metal. 4,517,434, Cl. 219-76.120.

Millipore Corporation: *See*—
Driscoll, Michael A.; and Edwards, James H., 4,517,085, Cl. 210-232.000.

Mills, David; Kington, Alan D.; and Close, Rodney J., to Rolls-Royce Limited. Mould assembly for casting metal articles. 4,516,621, Cl. 164-339.000.

Milner, David J., to Imperial Chemical Industries PLC. Process for the preparation of cyanotetrachlorobenzenes. 4,517,129, Cl. 260-465.00G.

Mimura, Nobuharu; Yoshida, Kazunori; Kawabata, Susumu; and Hasegawa, Junzo, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Weft yarn storage unit for jet looms. 4,516,611, Cl. 139-452.000.

Minamida, Isao: *See*—
Numata, Mitsuo; Minamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,517,361, Cl. 544-24.000.

Minamide, Seiko: *See*—
Shibaike, Narito; Minamide, Seiko; Kikuya, Satoshi; Terada, Hiroshi; and Zaitsu, Osamu, 4,517,613, Cl. 360-85.000.

Minamigi, Takashi: *See*—
Kanda, Katsumi; Okamura, Takaaki; Minamigi, Takashi; Inui, Tsuneo; and Kondo, Yoshikazu, 4,517,255, Cl. 428-626.000.

Mine, Katsutoshi; Suzuki, Toshio; and Hanada, Tsuneo, to Toray Silicone Company, Ltd. Method of making integral molded silicone products with different phases and the molded products prepared therefrom. 4,517,238, Cl. 428-212.000.

Mineo, Masatoshi: *See*—
Oka, Ken-ichiro; Mineo, Masatoshi; and Ono, Terumichi, 4,517,149, Cl. 264-210.800.

Mink, Bernardus H.; and Schoeber, Willem J. A. H., to Shell Oil Company. Process for removing fly ash particles from a gas at elevated pressure. 4,516,989, Cl. 55-68.000.

Minolta Camera Kabushiki Kaisha: *See*—
Tokumaru, Hisashi, 4,516,839, Cl. 350-426.000.

Minuhin, Vadim B., to Magnetic Peripherals Inc. Multichannel signal recovery circuit. 4,517,610, Cl. 360-24.000.

Miranda, Hector; and DeYoung, Thomas W., to Exxon Research and Engineering Co. Method of and apparatus for priming an ink jet. 4,517,577, Cl. 346-140.00R.

Mistyurik, John D., to Monarch Marking Systems, Inc. Hand-held labeler and labeling method. 4,516,498, Cl. 101-288.000.

Mita Industrial Co., Ltd.: *See*—
Honda, Nobuyasu; Yamakawa, Toshiro; and Ikeda, Toshimitsu, 4,517,274, Cl. 430-122.000.
Tsutsui, Eiji; Yoshioka, Masahiro; Murakami, Masahiro; and Iwao, Noriyuki, 4,516,849, Cl. 355-15.000.

Mitani, Masao: *See*—
Kawahito, Tsuneyoshi; Abe, Katsuo; Kamei, Tsuneaki; Fujimoto, Kazuyuki; Mitani, Masao; and Hiratsuka, Shigetoshi, 4,517,444, Cl. 219-216.000.

Mitani, Toragoro; Yasui, Hideo; and Morikawa, Hisashi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for polymerization of acrylate or methacrylate. 4,517,344, Cl. 526-62.000.

Mitchell, Debra J. Formed and washable diaper. 4,516,975, Cl. 604-385.00A.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Adachi, Hiromi; and Iwaya, Shoichi, 4,517,496, Cl. 315-227.00R.
Anzai, Nobuo; and Ikejima, Hiroyuki, 4,516,664, Cl. 187-29.00R.
Hirobumi, Saito; Kiyoshi, Ito; Kaichi, Higuchi; and Masao, Yamamoto, 4,516,944, Cl. 441-40.000.
Masuno, Katsuyoshi; and Kamata, Tsutomu, 4,516,557, Cl. 123-619.000.
Mitsuda, Kenro, 4,517,260, Cl. 429-41.000.
Ogawa, Hitoshi, 4,517,466, Cl. 290-36.00R.
Okumura, Mitsuhiro; Naya, Eizo; and Demizu, Michinosuke, 4,517,033, Cl. 148-432.000.
Oohashi, Yutaka, 4,516,558, Cl. 123-634.000.
Oohashi, Yutaka, 4,516,559, Cl. 123-634.000.
Uekubo, Yasuhiro, 4,517,619, Cl. 361-64.000.
Watanabe, Eiki, 4,516,665, Cl. 187-29.00R.

Mitsubishi Gas Chemical Company, Inc.: *See*—
Isshiki, Tomiya; Nawata, Takanari; Kijima, Yasuhiko; Ito, Akira; and Watanabe, Takayuki, 4,517,377, Cl. 560-261.000.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Kumagai, Naotake; Tatemoto, Minoru; Itoh: Yoji; and Inuzuka, Tokushige, 4,516,545, Cl. 123-192.00R.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Watabe, Shin, 4,516,407, Cl. 62-238.600.

Mitsuda, Kenro, to Mitsubishi Denki Kabushiki Kaisha. Single component cell for phosphoric acid type fuel cell. 4,517,260, Cl. 429-41.000.

Mitsue, Naoki; and Takahashi, Hideki, to Nippon Seiko K.K. Seal assembly with radially overlapping seal means. 4,516,783, Cl. 277-50.000.

Mitsui Engineering & Shipbuilding Co., Ltd.: *See*—
Tanaka, Yoshiharu, 4,516,403, Cl. 60-667.000.

Mitsui Petrochemical Industries, Ltd.: *See*—
Masumoto, Kazuhiro; Fujimura, Mitsuki; and Sawazaki, Masauki, 4,517,151, Cl. 264-540.000.
Matsunaga, Fujihisa; Nishimura, Tadahiko; Miyake, Etsuo; and Banba, Kiyotaka, 4,517,387, Cl. 568-728.000.

Mitsui Toatsu Chemicals, Inc.: *See*—
Takematsu, Tetsuo; Nakaya, Mitihiko; Moriyasu, Koichi; and Komoto, Nobuo, 4,517,381, Cl. 564-207.000.

Mittelmeier, Heinz; Moser, Heinz; and Leu, Beat, to Oscobal AG. Bone substitute and a method of production thereof. 4,516,276, Cl. 3-1.910.

Mitutoyo Mfg. Co., Ltd.: *See*—
Kanda, Yoshiro; Noguchi, Hironori; and Ikeda, Tadashi, 4,516,327, Cl. 33-169.00R.

Miura, Nobuo; and Ishii, Nolihisa, to Honda Giken Kogyo Kabushiki Kaisha. Ignition timing control system for internal combustion engine. 4,516,554, Cl. 123-418.000.

Miura, Tadao: *See*—
Takaoka, Takashi; Mochizuki, Masahiko; Yamashita, Mitsuo; and Miura, Tadao, 4,517,668, Cl. 369-111.000.

Miyagi, Ken: *See*—
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.

Miyahara, Kingo, to Dowa Co., Ltd. Fuel gasifying burner. 4,516,931, Cl. 431-168.000.

Miyake, Etsuo: *See*—
Matsunaga, Fujihisa; Nishimura, Tadahiko; Miyake, Etsuo; and Banba, Kiyotaka, 4,517,387, Cl. 568-728.000.

Miyao, Fumio: *See*—
Tan, Yoichi; and Miyao, Fumio, 4,517,531, Cl. 331-14.000.

Miyauchi, Masami; and Itoh, Masayuki, to Tokyo Shibaura Denki Kabushiki Kaisha. Alloy with constant modulus of elasticity. 4,517,158, Cl. 420-584.000.

Miyawaki, Toshi: *See*—
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.

Miyawaki, Toshio: *See*—
Numata, Mitsuo; Minamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,517,361, Cl. 544-24.000.

Miyazaki, Shoji: *See*—
Suzuki, Hiroshi; Gama, Yasuo; and Miyazaki, Shoji, 4,517,110, Cl. 252-180.000.

Miyazaki, Yasuyuki: *See*—
Yuki, Katsumi; Yoshida, Susumu; Ozeki, Mineo; Miyazaki, Yasuyuki; and Kawamata, Masaru, 4,517,645, Cl. 364-424.000.

Miyoshi, Hiroshi; Mori, Hirohumi; and Tanoue, Yoriko, to Sekisu Kagaku Kogyo Kabushiki Kaisha. Photo-degradable styrene resin compositions. 4,517,318, Cl. 523-126.000.

Miyoshi, Toshio: *See*—
Imanaka, Hiroshi; Miyoshi, Toshio; Konomi, Toshio; Kubochi, Yoshiaki; Hattori, Seiziro; and Kawakita, Takeshi, 4,517,299, Cl. 435-197.000.

Mizutani, Yasukazu: *See*—
Ubukata, Susumu; Mizutani, Yasukazu; and Iyoda, Shozo, 4,517,541, Cl. 337-89.000.

Mobil Oil Corporation: *See*—
Chester, Arthur W.; Garwood, William E.; and Schwartz, Albert B., 4,517,399, Cl. 585-533.000.
Dessau, Ralph M.; and Kerr, George T., 4,517,075, Cl. 208-111.000.
Dessau, Ralph M., 4,517,402, Cl. 585-820.000.
Schmitt, Kirk D., 4,517,128, Cl. 260-458.00C.

Mochizuki, Asao: *See*—
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.

Mochizuki, Masahiko: *See*—
Takaoka, Takashi; Mochizuki, Masahiko; Yamashita, Mitsuo; and Miura, Tadao, 4,517,668, Cl. 369-111.000.

Mock, Bruno A. Control armature inserted in the flow route of a system for transferring pressure media in a gaseous and/or liquid gaseous state. 4,516,603, Cl. 137-559.000.

Molinazzi, Roberto, to Albini & Fontanot S.p.A. Modular support for stairway steps. 4,516,367, Cl. 52-182.000.

Moline Corporation: *See*—
Hampel, Lawrence E.; and Freese, Edward O., 4,516,790, Cl. 280-502.000.

Molnar, Rick K., to Hawk Industries, Inc. Mastic applicator and adjustable blade assembly. 4,516,868, Cl. 401-5.000.

Moltrasio, Mario; and Perrucchini, Vincenzo, to Car-ventomatic S.p.A. System for picking up and separating bags from a pack to be applied to automatic bag inserting apparatus. 4,516,762, Cl. 271-11.000.

Monarch Marking Systems, Inc.: *See*—
Mistyurik, John D., 4,516,498, Cl. 101-288.000.
Pou, Frederick M.; and Straub, Richard L., 4,516,497, Cl. 101-240.000.

Mono-Flo Lister Limited: *See*—
Mallinson, Ronald I., 4,516,533, Cl. 119-72.000.

Monsanto Company: *See*—
Heaps, John F.; and Erickson, Dennis E., 4,517,327, Cl. 524-315.000.
Mottus, Edward H., 4,517,329, Cl. 524-401.000.

Montalbano, Anthony P.: *See*—
McDonald, Quentin H.; Montalbano, Anthony P.; and Sieczkowski, Philip, 4,516,806, Cl. 297-457.000.

Montedison S.p.A.: *See*—
Cuffiani, Illaro; Longi, Paolo; Zucchini, Umberto; and Pennini, Gianni, 4,517,307, Cl. 502-119.000.

Montgomery, Allen W.: *See*—
Baran, Michael S.; Besasie, Joseph C.; Warren, Wayne L.; and Montgomery, Allen W., 4,517,418, Cl. 179-156.00R.

Moon, Suhdok D.: *See*—
Lin, Frank W.; Moon, Suhdok D.; Van, Tri S.; and Anzai, Max I., 4,517,503, Cl. 318-561.000.

Moore, Paul E.: *See*—
Sadauskas, Raymond L.; and Moore, Paul E., 4,517,440, Cl. 219-145.100.

More, Claude: *See*—
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.

Morel, Don L.; Gay, Robert R.; and Turner, Gary B., to Atlantic Richfield Company. Series connected solar cells and method of formation. 4,517,403, Cl. 136-249.000.

Moretz, Nellie M.: *See*—
Matejka, Robert C.; and Moretz, Nellie M., 4,517,228, Cl. 427-370.000.

Mori, Hirohumi: *See*—
Miyoshi, Hiroshi; Mori, Hirohumi; and Tanoue, Yoriko, 4,517,318, Cl. 523-126.000.

Mori, Kazuhiko: *See*—
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.

Mori, Yoshihisa: *See*—
Kakuhashi, Takeshi; Tahara, Hiroshi; and Mori, Yoshihisa, 4,517,546, Cl. 338-320.000.

Moriarty, Michael P., to Rockwell International Corporation. Combustion method. 4,517,165, Cl. 423-244.000.

Morigaki, Masakazu: *See*—
Noguchi, Yasuhiro; and Morigaki, Masakazu, 4,517,286, Cl. 430-562.000.

Morikawa, Hisashi: *See*—
Mitani, Toragoro; Yasui, Hideo; and Morikawa, Hisashi, 4,517,344, Cl. 526-62.000.

Morikawa, Kunihiko; Higuchi, Megumu; and Yanai, Tokiyoshi, to Nissan Motor Co., Ltd. Method of manufacturing racks for variable ratio steering gears. 4,516,422, Cl. 72-377.000.

Morishita, Tatsuo; Funakoshi, Fumio; Nakamura, Kenichi; and Takamori, Kazuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Cordless remote control apparatus. 4,517,564, Cl. 340-825.690.

Moriya, Shigeru, to TDK Corporation. Charging device for an electrostatic copying machine. 4,516,848, Cl. 355-3.0CH.

Moriyasu, Koichi: *See*—
Takematsu, Tetsuo; Nakaya, Mitihiko; Moriyasu, Koichi; and Komoto, Nobuo, 4,517,381, Cl. 564-207.000.

Morofuji, Takeshi: *See*—
Neki, Shigeo; Shinozaki, Nozomu; and Morofuji, Takeshi, 4,516,514, Cl. 112-275.000.

Morrison, Robert A.: *See*—
Frink, Attila; and Morrison, Robert A., 4,517,625, Cl. 361-399.000.

Morrow, William H.: *See*—
Preston, John M.; Ward, Thomas V.; and Morrow, William H., 4,516,857, Cl. 356-418.000.

Mosburger, Hans, to BHS-Bayerische Berg-, Hutten- und Salzwerke Aktiengesellschaft. Straight line cutting and/or groove machine for moving material webs, especially for corrugated paper webs. 4,516,454, Cl. 83-499.000.

Mosely, Jeannine. Blank for folding an octahedron and folded product. 4,517,251, Cl. 428-542.800.

Moser, Heinz: *See*—
Mittelmeier, Heinz; Moser, Heinz; and Leu, Beat, 4,516,276, Cl. 3-1.910.

Moser, Otto W.; and Thilo, Peer, to Siemens Aktiengesellschaft. Method and apparatus for inspecting a danger alarm system. 4,517,554, Cl. 340-514.000.

Moss, Gerald, to Exxon Research and Engineering Co. Apparatus for use in processing a substance in a fluidized bed. 4,517,162, Cl. 422-142.000.

Motoo, Akihiko: *See*—
Fujita, Daijiro; Motoo, Akihiko; and Maki, Yoshiki, 4,516,925, Cl. 425-463.000.

Motorola, Inc.: *See*—
Burke, Timothy M.; and Noble, Scott W., 4,517,561, Cl. 340-825.070.
Campbell, Jules D., Jr., 4,517,551, Cl. 340-347.0DA.
Davis, William F., 4,517,524, Cl. 330-257.000.
Freeburg, Thomas A.; and Krebs, Jay, 4,517,669, Cl. 370-82.000.
Gray, Randall C.; and Main, W. Eric, 4,517,547, Cl. 340-59.000.
Neidorff, Robert A., 4,517,532, Cl. 331-57.000.
Nordbrock, Raymond E.; and Spears, Richard L., 4,517,507, Cl. 322-28.000.
Petty, Cleon, 4,517,475, Cl. 307-272.00A.

Rose, John W., 4,517,220, Cl. 427-8.000.
Mott, Philip J., to Borg-Warner Corporation. Power transmission chain-belt. 4,516,963, Cl. 474-245.000.
Mott, Philip J., to Borg-Warner Corporation. Power transmission chain-belt. 4,516,965, Cl. 474-245.000.
Mottur, George P.; and Glass, Richard W., to Frito-Lay, Inc. Reduced calorie puffed snack food products. 4,517,204, Cl. 426-94.000.
Mottus, Edward H., to Monsanto Company. Polymeric antitumor agent. 4,517,329, Cl. 524-401.000.
Motzkau, Siegfried: *See—*
Szelagowski, Peter; and Motzkau, Siegfried, 4,516,521, Cl. 118-50.000.
Mourou, Gerard; and Sizer, Theodore, II, to University of Rochester, The. Dye laser medium for subpicosecond laser pulse generation. 4,517,675, Cl. 372-53.000.
Moyer, Maynard M.: *See—*
Beard, Frederick H.; Moyer, Maynard M.; and Smith, Clarence, Jr., 4,516,307, Cl. 29-564.000.
MU, Inc.: *See—*
Staab, Donald C.; and Farley, Clayton E., 4,516,808, Cl. 299-39.000.
Mueller, Franz-Josef: *See—*
Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 568-885.000.
Muhlfeld, Hans P., Jr.: *See—*
Graf, Matthew C.; Muhlfeld, Hans P., Jr.; and Valentine, Edward H., 4,517,661, Cl. 364-900.000.
Mukaiyama, Fumiaki, to Kabushiki Kaisha Suwa Seikosha. FSK Demodulator employing a switched capacitor filter and period counters. 4,517,519, Cl. 329-126.000.
Mulhern, Louise J. Privacy screen module. 4,516,620, Cl. 160-351.000.
Muller, Bernard; Piat, Rene ; Rensing, Cornelis; and Trajin, Jean-Paul, to Hoffmann-La Roche Inc. Process for preparing $\beta'$ form of copper 8-hydroxyquinoline. 4,517,362, Cl. 546-7.000.
Muller, Gerhard: *See—*
Leistner, Gerhard; Muller, Gerhard; Sell, Gunther; and Bauer, Alexander, 4,517,093, Cl. 210-629.000.
Muller, Hanns P.: *See—*
Dahm, Manfred; Weimann, Norbert; Nehen, Ulrich; Muller, Hanns P.; Jabs, Gert; Awater, Albert; and Barnes, James M., 4,517,141, Cl. 264-4.700.
Muller, Jurgen: *See—*
Stahl, Werner; and Muller, Jurgen, 4,516,763, Cl. 271-11.000.
Muller, Manfred: *See—*
Arndt, Peter J.; Muller, Manfred; Schlosser, Fritz; and Wenzel, Franz, 4,517,380, Cl. 564-206.000.
Muller, Rolf, to Papst Motoren GmbH & Co, KG. Tachogenerator for speed control of electric motors. 4,517,480, Cl. 310-68.00R.
Mulliner, Richard R.; and Rocke, Richard D., to Hughes Aircraft Company. Lightweight slot array antenna structure. 4,517,571, Cl. 343-771.000.
Mullins, Carolyn C.: *See—*
Levine, Lawrence W.; and Mullins, Carolyn C., 4,517,203, Cl. 426-19.000.
Mullins, Jack R., to J. W. Lighting Inc. Indirect light reflector. 4,517,631, Cl. 362-346.000.
Mundie, Craig J.: *See—*
Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., 4,517,642, Cl. 364-200.000.
Munnecke, Douglas M.: *See—*
Williams, David; and Munnecke, Douglas M., 4,517,101, Cl. 252-8.55D.
Muraishi, Masakazu: *See—*
Umetsu, Yoshihiro; Muraishi, Masakazu; Ito, Osamu; and Kakeba, Masakatsu, 4,516,788, Cl. 280-6.00R.
Murakami, Koichi: *See—*
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.
Murakami, Masahiro: *See—*
Tsutsui, Eiji; Yoshioka, Masahiro; Murakami, Masahiro; and Iwao, Noriyuki, 4,516,849, Cl. 355-15.000.
Muralidhara, Ranya: *See—*
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.
Muramatsu, Toshio; Totani, Nagao; and Mangold, Helmut K., to Rohm GmbH. Method for the preparation of physiological effectors. 4,517,297, Cl. 435-128.000.
Murata, Masanori: *See—*
Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, 4,517,282, Cl. 430-399.000.
Murata, Shinichi: *See—*
Inomata, Koichiro; and Murata, Shinichi, 4,517,017, Cl. 75-123.00B.
Murayama, Masato, to Honda Giken Kogyo Kabushiki Kaisha. Communication system for a motor vehicle. 4,517,417, Cl. 179-156.00R.
Murayama, Tomio; Kikuchi, Yoshiki; and Ohmori, Takashi, to Fuji Xerox Co., Ltd. Printing system. 4,517,560, Cl. 340-790.000.
Murphy, David A.; and Spellar, Peter C., to Frick Company. Microprocessor control of moveable slide stop and a moveable slide valve in a helical screw rotary compressor. 4,516,914, Cl. 417-282.000.
Murphy, Gordon D.; and Bishop, Ernest C., to Fishery Products, Inc. Food package and storage unit. 4,517,206, Cl. 426-115.000.
Murphy, Wesley W., III; and Hettiger, James, to RCA Corporation. Dynamic noise filter for an audio signal in a television. 4,517,602, Cl. 358-198.000.
Murray, Pat L.: *See—*
McClellan, Thomas R.; and Murray, Pat L., 4,516,524, Cl. 118-683.000.
Murray, Robert T.: *See—*
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Murrer, Barry A.: *See—*
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Muto, Anthony. Plumbing repair device and method. 4,516,593, Cl. 137-15.000.
Mutoh, Naoki: *See—*
Sakakibara, Hideo; Awata, Masashi; Satoi, Shuzo; Mutoh, Naoki; Takada, Masaki; and Hayashi, Mitsuo, 4,517,296, Cl. 435-119.000.
Naarmann, Herbert: *See—*
Lynch, John; Naarmann, Herbert; Schulz, Gunther; Vyvial, Rudolf; Wallbillich, Gunter; and Zurger, Manfred, 4,517,277, Cl. 430-281.000.
Nabisco Brands, Inc.: *See—*
Aldrich, Deborah G., 4,517,205, Cl. 426-103.000.
Nagae, Hiromitsu: *See—*
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Nagae, Yoshio: *See—*
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Nagahiro, Kenichi: *See—*
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Nagai, Tadashi: *See—*
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.
Nagasaki, Yoshio, to Kanda Tushin Kogyo. Method for checking function states in key telephone system. 4,517,409, Cl. 179-81.00C.
Nagase, Hyoshuke: *See—*
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, 4,517,087, Cl. 210-396.000.
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, to Hitachi, Ltd.; and Nagase, Hyoshuke. Filtration/separation apparatus. 4,517,087, Cl. 210-396.000.
Nagase, Yuji: *See—*
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, 4,517,087, Cl. 210-396.000.
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Nagashima, Masayoshi; Yamane, Hiroshi; and Yamashita, Mitsuo, to Tokyo Shibaura Denki Kabushiki Kaisha. Color printing apparatus. 4,517,591, Cl. 358-75.000.
Nagashima, Nao: *See—*
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.
Nagy, Monte L.: *See—*
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Naipawer, Richard E.; and Chalk, Alan J., to Givaudan Corporation. Process for the rearrangement of epoxides. 4,517,386, Cl. 568-483.000.
Nakagawa, Yukio, to Kabushiki Kaisha Ishida Koki Seisakusho. Combinatorial weighing method and apparatus. 4,516,643, Cl. 177-1.000.
Nakahara, Mitsuharu; Ishida, Tomio; Honjo, Norifumi; and Yoshida, Yoshitaka, to Daihatsu Motor Company. Variable compression system for internal combustion engines. 4,516,537, Cl. 123-48.0AA.
Nakahashi, Ken-ichi; and Mihara, Shin-ichi, to Olympus Optical Co., Ltd. In-focus detector for a binocular stereomicroscope. 4,516,840, Cl. 350-515.000.
Nakajima, Kihei: *See—*
Uchino, Hiroshi; Nakajima, Kihei; and Kurosawa, Ryoichi, 4,517,636, Cl. 363-138.000.
Nakajima, Mikio: *See—*
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Nakajima, Mutsuhiko, to Ace Pak Company Incorporated. Automatic carton packing machine. 4,516,381, Cl. 53-375.000.
Nakajima, Mutsuhiko, to Ace Pak Company Incorporated. Automatic carton packing machine. 4,516,382, Cl. 53-375.000.
Nakamura, Goto: *See—*
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Nakamura, Hiroyuki: *See—*
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Nakamura, Kazumasa: *See—*
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Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, to Nissan Motor Company, Ltd. Variable venturi carburetor. 4,517,134, Cl. 261-39.00A.

Nakamura, Kenichi: *See*—
Morishita, Tatsuo; Funakoshi, Fumio; Nakamura, Kenichi; and Takamori, Kazuo, 4,517,564, Cl. 340-825.690.
Nakamura, Kenji; and Ideno, Shigeru, to Shimadu Corporation. Analog to digital conversion method and apparatus. 4,517,550, Cl. 340-347.0CC.
Nakamura, Kousuke: *See*—
Matsushita, Yasuo; Nakamura, Kousuke; and Ura, Mitsuru, 4,517,584, Cl. 357-80.000.
Nakamura, Naoji: *See*—
Masumoto, Hakaru; and Nakamura, Naoji, 4,517,156, Cl. 420-463.000.
Nakamura, Takashi: *See*—
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Nakamura, Yukinobu; Tagami, Katsutoshi; and Takahashi, Tsuneo, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for visually indicating the current location of an automotive vehicle. 4,517,565, Cl. 340-995.000.
Nakanishi, Kiyoshi: *See*—
Okumura, Takeshi; Nakanishi, Kiyoshi; and Nakajima, Mikio, 4,516,544, Cl. 123-188.00M.
Nakano, Eiichi: *See*—
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Nakao, Makoto: *See*—
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Nakatani, Keiichi, to Abbott Laboratories. Method of making polyurethane foam. 4,517,313, Cl. 521-51.000.
Nakatani, Masayuki: *See*—
Sugisawa, Ko; Sekiguchi, Kazuya; Taguchi, Masao; Nakatani, Masayuki; and Iwata, Hitoshi, 4,516,596, Cl. 137-240.000.
Nakatani, Mitsuo: *See*—
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Nakatsuji, Haruo: *See*—
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Nakaya, Mitihiko: *See*—
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Nakaya, Shyunichi; and Nakamura, Hiroyuki, to Tokyo Shibaura Denki Kabushiki Kaisha. Valve mechanism for low temperature applications. 4,516,599, Cl. 137-375.000.
Nakayama, Keiko: *See*—
Takayama, Hiroaki; Yamada, Sachiko; Nakayama, Keiko; and Suda, Tatsuo, 4,517,125, Cl. 260-397.200.
Nakazato, Teiji. Griddle cleaning device. 4,516,870, Cl. 401-146.000.
Namkung Promotions Inc.: *See*—
Kiyokane, Jerrilyn C., 4,516,793, Cl. 283-103.000.
Nance, Weldon B.; and Calkins, Jack M., to Witco Chemical Corporation. Lubricating wellbore fluid and method of drilling. 4,517,100, Cl. 252-8.50C.
Nankivell, David L. Hand paddle for a paddle ball game. 4,516,774, Cl. 273-67.00B.
Nascimento, Dennis F.: *See*—
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Nasionale Sweisware (Eiendoms) Beperk: *See*—
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Naslund, Erik I.: *See*—
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National Research Development Corporation: *See*—
Evans, David M.; and Weightman, Barry O., 4,516,569, Cl. 128-92.0BC.
Klinner, Wilfred E., 4,516,390, Cl. 56-364.000.
Markham, Peter G.; Townsend, Rodney; and Davies, Jeffrey W., 4,517,177, Cl. 424-93.000.
Stott, Edward J.; Thomas, Lewis H.; and Jebbett, Norma J., 4,517,304, Cl. 436-518.000.
National Starch and Chemical Corporation: *See*—
Szymanski, Chester D.; and Neigel, Dennis, 4,517,351, Cl. 527-312.000.
Tracton, Arthur A.; and Guidice, John N., 4,517,240, Cl. 428-326.000.
Natoli, John: *See*—
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Nau, Alan J. Batting aid. 4,516,771, Cl. 273-26.00R.
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Nawa, Masumi: *See*—
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Nawata, Takanari: *See*—
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Naya, Eizo: *See*—
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NCR Corporation: *See*—
Cheffer, Harold H., 4,517,470, Cl. 307-64.000.
Turi, Raymond A.; and Pfeifer, Robert F., 4,516,313, Cl. 29-571.000.
NEC Corporation: *See*—
Aihara, Shigenobu; and Yamada, Akio, 4,517,527, Cl. 330-287.000.
Takezawa, Susumu; Ikebe, Ken'ichi; Ayada, Haruki; Fukui, Tatsuyuki; and Okada, Munenori, 4,516,746, Cl. 244-170.000.
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Neidorff, Robert A., to Motorola, Inc. Programmable ring oscillator. 4,517,532, Cl. 331-57.000.
Neigel, Dennis: *See*—
Szymanski, Chester D.; and Neigel, Dennis, 4,517,351, Cl. 527-312.000.
Neki, Shigeo; Shinozaki, Nozomu; and Morofuji, Takeshi, to Matsushita Electric Industrial Co., Ltd. Circuit arrangement for controlling sewing machine speed and for positioning sewing needle. 4,516,514, Cl. 112-275.000.
Nelson, David A.: *See*—
Chulada, Edmund C.; and Nelson, David A., 4,516,302, Cl. 29-156.80R.
Nelson, Frederick J.; and Richards, Ray S., to Owens-Illinois, Inc. Waste heat recovery from regenerative furnaces. 4,516,934, Cl. 432-30.000.
Nelson, Mark L.: *See*—
Nelson, Otis L., Jr.; and Nelson, Mark L., 4,516,981, Cl. 44-53.000.
Nelson, Otis L., Jr.; and Nelson, Mark L. Residual oil sludge dispersant. 4,516,981, Cl. 44-53.000.
Nelson, Wayne I.: *See*—
Amiot, Bruce P.; Fuller, Larry E.; Martinez, Felix J.; Cosentino, Louis C.; Harm, William H.; and Nelson, Wayne I., 4,517,081, Cl. 210-85.000.
Nerstrom, James S., to Outboard Marine Corporation. Two-cycle internal combustion engine including means for varying cylinder port timing. 4,516,540, Cl. 123-65.0PE.
Nestec, S.A.: *See*—
Hsu, Jau Y., 4,517,215, Cl. 426-557.000.
Roychoudhury, Rathindra N., 4,517,120, Cl. 426-655.000.
Neuendorf, Hans-Christoph: *See*—
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Neumann, Peter: *See*—
Graser, Fritz; Hoffmann, Gerhard; Leyrer, Reinhold J.; Neumann, Peter; and Patsch, Manfred, 4,517,270, Cl. 430-58.000.
Nevamar Corporation: *See*—
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Glenn, William E., 4,517,597, Cl. 358-141.000.
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Newkirk, Martha; and Newkirk, Larry. Card-actuated telecommunication network. 4,517,412, Cl. 179-7.10R.
Neyer, Norbert, to LGZ Landis & Gyr Zug AG. Method and an apparatus for synchronizing received binary signals. 4,517,682, Cl. 375-106.000.
Nicholas, Harry J. Game and key chain device. 4,516,776, Cl. 273-146.000.
Nickola, Richard A.; and Agarwal, Shashi B., to Inland Steel Company. Diffusion treated hot-dip aluminum coated steel and method of treating. 4,517,229, Cl. 427-383.900.
Niehaus, Roy G. Spare tire cover. 4,516,706, Cl. 224-42.200.
Nielsen, K. Frank: *See*—
Jensen, N. Due; and Nielsen, K. Frank, 4,516,915, Cl. 417-365.000.
Nieman, Gerald R., to International Telephone & Telegraph Corporation. Electrical connector locking mechanism. 4,516,821, Cl. 339-75.00M.
Nierlich, Franz: *See*—
Obenaus, Fritz; Nierlich, Franz; Reitemeyer, Otto; and Scholz, Bernhard, 4,517,395, Cl. 585-259.000.
Niggemann, Richard E., to Sundstrand Corporation. Deaerator usable in a system for a steam powered torpedo and deaerating method. 4,516,987, Cl. 55-52.000.
Nihon Electric Co. Ltd.: *See*—
Kawashima, Ryozo, 4,516,991, Cl. 55-124.000.
Nihon Kagaku Kogyo Co., Ltd.: *See*—
Hironaga, Katsuji; and Nishiura, Tadaki, 4,516,432, Cl. 73-861.040.
Nihon Parkerizing Co.: *See*—
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.
Nikora, Robert J. Mobile self-contained video game system with instantaneously selectable game cartridges. 4,516,777, Cl. 273-148.00B.
Nippon Air Brake Co., Ltd.: *See*—
Harada, Atsumu; and Arikawa, Tetsuro, 4,517,647, Cl. 364-426.000.
Nippon Electric Co., Ltd.: *See*—
Suzuki, Norio, 4,517,596, Cl. 358-133.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
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Nippon Kokan Kabushiki Kaisha: *See*—
Sugitani, Yuji; and Kobayashi, Yukio, 4,517,438, Cl. 219-125.120.
Nippon Paint Co., Ltd.: *See*—
Sakurai, Kiyomi, 4,517,278, Cl. 430-286.000.

Nippon Seiko K.K.: *See*—
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Nippon Soda Co. Ltd.: *See*—
Kizawa, Hidenori; Fujiyama, Norimasa; Kobayashi, Jitsuo; and Ito, Akinori, 4,517,173, Cl. 424-16.000.
Nippon Soken, Inc.: *See*—
Ina, Toshikazu; Kawai, Hisasi; Kohama, Tokio; Obayashi, Hideki; Sawada, Daisaku; and Shigematsu, Takashi, 4,517,648, Cl. 364-431.010.
Takeuchi, Yukihisa; and Tomita, Masahiro, 4,516,993, Cl. 55-283.000.
Nippondenso Co., Ltd.: *See*—
Takeuchi, Yukihisa; and Tomita, Masahiro, 4,516,993, Cl. 55-283.000.
Nishihara, Tadao, to Iseki & Co., Ltd. Front-wheel drive device for vehicle. 4,516,654, Cl. 180-255.000.
Nishikawa, Masaji, to Olympus Optical Company, Ltd. Toner cleaning device for electrophotographic copying machine. 4,516,850, Cl. 355-15.000.
Nishikawa, Masao; Aoki, Takashi; Sakai, Shinzo; and Yoshizawa, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Control apparatus for a torque convertor clutch. 4,516,671, Cl. 192-.076.
Nishikawa, Masumi, to Aisin Seiki Kabushiki Kaisha. Locking mechanism for a telescopic steering wheel. 4,516,440, Cl. 74-493.000.
Nishikawa, Yoshihiro: *See*—
Inoue, Sukejiro; Hasegawa, Tetsuo; and Nishikawa, Yoshihiro, 4,517,273, Cl. 430-111.000.
Nishimura, Shinichi: *See*—
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Nishimura, Tadahiko: *See*—
Matsunaga, Fujihisa; Nishimura, Tadahiko; Miyake, Etsuo; and Banba, Kiyotaka, 4,517,387, Cl. 568-728.000.
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Nishimuro, Yoshiaki: *See*—
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Nishino, Chikae: *See*—
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Nishio, Katsufumi: *See*—
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Nishiura, Tadaki: *See*—
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Nishiwaki, Shunro: *See*—
Yamanaka, Koichi; Gotoh, Tetsuro; Aoki, Masanori; Kataoka, Isao; and Nishiwaki, Shunro, 4,517,091, Cl. 210-512.100.
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Nissan Motor Company, Ltd.: *See*—
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Aoyoma, Shunichi; and Kato, Manabu, 4,516,542, Cl. 123-90.160.
Morikawa, Kunihiko; Higuchi, Megumu; and Yanai, Tokiyoshi, 4,516,422, Cl. 72-377.000.
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.
Onishi, Kimimasa; Takahashi, Takao; and Koriyama, Masayuki, 4,516,610, Cl. 139-435.000.
Sone, Masazumi; Imai, Iwao; and Nagae, Hiromitsu, 4,516,319, Cl. 29-877.000.
Umetsu, Yoshihiro; Muraishi, Masakazu; Ito, Osamu; and Kakeba, Masakatsu, 4,516,788, Cl. 280-6.00R.
Nissenbaum, Judith. Protective overshoe. 4,516,336, Cl. 36-7.10R.
Nisshin Flour Milling Co., Ltd.: *See*—
Koyama, Hiroyasu; Tsuji, Masahiro; and Suzuki, Yoshikuni, 4,517,365, Cl. 546-142.000.
Nitschko, Theodor: *See*—
Riss, Wilfried; Nitschko, Theodor; Spitaler, Engelbert; and Oberleitner, Gerhard, 4,516,791, Cl. 280-612.000.
Nitto Electric Industrial Co., Ltd.: *See*—
Kakuhashi, Takeshi; Tahara, Hiroshi; and Mori, Yoshihisa, 4,517,546, Cl. 338-320.000.
Nix, Richard; and Compton, David J., to Automotive Products, plc. Quick connect cylinder mount stucture. 4,516,748, Cl. 248-1.000.
NL Industries, Inc.: *See*—
Mardis, Wilbur S.; and Finlayson, Claude M., 4,517,112, Cl. 252-315.200.
Noble, Scott W.: *See*—
Burke, Timothy M.; and Noble, Scott W., 4,517,561, Cl. 340-825.070.
Noda, Aiji. Method for the treatment of calcifying pancreatitis. 4,517,309, Cl. 514-376.000.
Noguchi, Hironori: *See*—
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Noguchi, Yasuhiro; and Morigaki, Masakazu, to Fuji Photo Film Co., Ltd. Color diffusion transfer light-sensitive element with amine solvent. 4,517,286, Cl. 430-562.000.
Noonan, Denise J.: *See*—
Russell, John L., Jr.; and Noonan, Denise J., 4,516,535, Cl. 128-1.100.
Nopper, Guido H.: *See*—
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Norberg, Anna K. E.: *See*—
Inculet, Ion I.; Norberg, Anna K. E.; and Hepher, Nicholas M., 4,517,078, Cl. 209-127.300.
Nordbrock, Raymond E.; and Spears, Richard L., to Motorola, Inc. Multiple output alternator system. 4,517,507, Cl. 322-28.000.
Norris, Philip R.: *See*—
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North American Philips Consumer Electronics Corp.: *See*—
Say, Donald L., 4,517,488, Cl. 313-414.000.
Tamburrino, Richard A., 4,517,487, Cl. 313-407.000.
North American Philips Lighting Corporation: *See*—
Flohn, Paul H., 4,516,446, Cl. 82-38.00A.
Northern Engineering Industries plc: *See*—
Whinfrey, Dennis R., 4,516,728, Cl. 239-399.000.
Northern Telecom Limited: *See*—
Haskins, Steve W., 4,517,420, Cl. 179-164.000.
Johnston, Harold; and Benoit, Richard E., 4,516,818, Cl. 339-36.000.
Straub, Albert M.; Mabrey, Theodore R.; and Vokovich, Daniel L., 4,517,614, Cl. 360-85.000.
Northland Aluminum Products, Inc.: *See*—
Ishii, Thomas K.; and Jorgensen, Jorgen A., 4,517,432, Cl. 219-10.55F.
Northrop Corporation: *See*—
Agrawal, Suphal P., 4,516,419, Cl. 72-60.000.
Norwood, Richard L.: *See*—
Krasznai, Charles Z.; and Norwood, Richard L., 4,517,452, Cl. 219-413.000.
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Novak, Thaddeus. Solar powered vehicle. 4,516,647, Cl. 180-2.200.
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Plaziaud, Alain, 4,517,153, Cl. 376-253.000.
Nuclear Medicine, Inc.: *See*—
Russell, John L., Jr.; and Noonan, Denise J., 4,516,535, Cl. 128-1.100.
Numata, Mitsuo; Minamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, to Takeda Chemical Industries, Ltd. Cephalosporin derivatives. 4,517,361, Cl. 544-24.000.
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Erdmannsdorfer, Hans; Wagner, Manfred; Numrich, Rudi; and Weyh, Gerd, 4,516,990, Cl. 55-96.000.
Nunn, Timothy A.: *See*—
Kurtz, Anthony D.; Nunn, Timothy A.; and Mallon, Joseph R., 4,516,430, Cl. 73-727.000.
Nuovo Pignone S.p.A.: *See*—
Vinciguerra, Constantino, 4,516,908, Cl. 415-122.00R.
Nurk, Siegfried, to Sipra, Patententwicklungs-und Beteiligungsgegeselischaft gmbH. Thread-braking device for a textile machine. 4,516,738, Cl. 242-152.100.
Nurmio, Matti: *See*—
Eskelinen, Pekka; and Nurmio, Matti, 4,516,330, Cl. 34-23.000.
Obara, Hiroyuki, to Takara Co., Ltd. Reconfigurable toy assembly. 4,516,948, Cl. 446-95.000.
Obayashi, Hideki: *See*—
Ina, Toshikazu; Kawai, Hisasi; Kohama, Tokio; Obayashi, Hideki; Sawada, Daisaku; and Shigematsu, Takashi, 4,517,648, Cl. 364-431.010.
Obenaus, Fritz; Nierlich, Franz; Reitemeyer, Otto; and Scholz, Bernhard, to Chemische Werke Huls Aktiengesellschaft. Process for the selective hydrogenation of polyunsaturated hydrocarbons in hydrocarbon mixtures. 4,517,395, Cl. 585-259.000.
Oberleitner, Gerhard: *See*—
Riss, Wilfried; Nitschko, Theodor; Spitaler, Engelbert; and Oberleitner, Gerhard, 4,516,791, Cl. 280-612.000.
Occidental Chemical Corporation: *See*—
Tang, David Y., 4,517,372, Cl. 549-246.000.
Ochi, Kenji: *See*—
Matsuyama, Kiyoshi; Ochi, Kenji; Ogawa, Hiroyuki; Suzaki, Takuya; and Imai, Kazuyoshi, 4,517,246, Cl. 428-407.000.
Ochiai, Chiaki, to Aisin Seiki Kabushiki Kaisha. Tandem diaphragm brake booster. 4,516,474, Cl. 91-519.000.
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Goto, Hideo; Hosoe, Takeo; Oda, Toshinori; and Ohtsuka, Sosuke, 4,516,978, Cl. 8-510.000.
O'Donnell, Brian C. Snow removal device. 4,516,799, Cl. 294-54.500.
Ogawa, Atsushi, to Trio Kabushiki Kaisha. Circuit for converting a staircase waveform into a smoothed analog signal. 4,517,520, Cl. 329-145.000.
Ogawa, Hiroyuki: *See*—
Matsuyama, Kiyoshi; Ochi, Kenji; Ogawa, Hiroyuki; Suzaki, Takuya; and Imai, Kazuyoshi, 4,517,246, Cl. 428-407.000.

Ogawa, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Vacuum pump. 4,517,466, Cl. 290-36.00R.
Ogawa, Ken: *See*—
Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, 4,517,282, Cl. 430-399.000.
Ogawa, Yuichiro: *See*—
Takeshita, Masaru; Tokunaga, Toshio; and Ogawa, Yuichiro, 4,516,451, Cl. 83-171.000.
Ohi Seisakusho Company, Ltd.: *See*—
Akiyama, Yoshinori; Nishimura, Shinichi; and Harigaya, Isamu, 4,516,811, Cl. 308-3.00R.
Ohio Table Pad Company, The: *See*—
Krauser, Christopher P., 4,517,232, Cl. 428-57.000.
Ohkouchi, Fusakichi; and Suzuki, Kazuhiro, to Ricoh Company, Ltd. Method of and apparatus for compensating image in image reproduction system. 4,517,607, Cl. 358-284.000.
Ohmine, Toshinori: *See*—
Manome, Taichi; Ohmine, Toshinori; Okazaki, Takao; and Arai, Mamoru, 4,517,300, Cl. 435-317.000.
Ohmori, Takashi: *See*—
Murayama, Tomio; Kikuchi, Yoshiki; and Ohmori, Takashi, 4,517,560, Cl. 340-790.000.
Ohmura, Hiroshi, to Fuji Photo Film Co., Ltd. Camera. 4,516,843, Cl. 354-173.100.
Ohnishi, Eiichi: *See*—
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.
Ohta, Tokuya: *See*—
Kobayashi, Masatsune; Haruta, Masahiro; Eida, Tsuyoshi; and Ohta, Tokuya, 4,517,244, Cl. 428-342.000.
Ohtsuka, Kenji: *See*—
Koiso, Yasuhiko; Ohtsuka, Kenji; and Yahara, Shigeo, 4,516,564, Cl. 126-263.000.
Ohtsuka, Sosuke: *See*—
Goto, Hideo; Hosoe, Takeo; Oda, Toshinori; and Ohtsuka, Sosuke, 4,516,978, Cl. 8-510.000.
Oka, Ken-ichiro; Mineo, Masatoshi; and Ono, Terumichi, to Toray Industries, Inc. Process for producing polyester fiber. 4,517,149, Cl. 264-210.800.
Okada, Munenori: *See*—
Takezawa, Susumu; Ikebe, Ken'ichi; Ayada, Haruki; Fukui, Tatsuyuki; and Okada, Munenori, 4,516,746, Cl. 244-170.000.
Okamoto, Kenji; Nishiwaki, Yoshikazu; Matsuoka, Shunji; and Nishiura, Yozo, to Sumitomo Electric Industries, Ltd. Process for fabricating integrated optics. 4,517,280, Cl. 430-321.000.
Okamoto, Masashi: *See*—
Maeda, Kiyoshi; and Okamoto, Masashi, 4,517,608, Cl. 358-298.000.
Okamura, Takaaki: *See*—
Kanda, Katsumi; Okamura, Takaaki; Minamigi, Takashi; Inui, Tsuneo; and Kondo, Yoshikazu, 4,517,255, Cl. 428-626.000.
Okazaki, Takao: *See*—
Manome, Taichi; Ohmine, Toshinori; Okazaki, Takao; and Arai, Mamoru, 4,517,300, Cl. 435-317.000.
Oki Electric Industry Co., Ltd.: *See*—
Tsukakoshi, Shosaku, 4,517,549, Cl. 340-347.0AD.
Okita, Hiroshi: *See*—
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.
Okumura, Mitsuhiro; Naya, Eizo; and Demizu, Michinosuke, to Mitsubishi Denki Kabushiki Kaisha. Contact material for vacuum circuit breaker. 4,517,033, Cl. 148-432.000.
Okumura, Takeo: *See*—
Iwabuchi, Hidetoshi; and Okumura, Takeo, 4,517,175, Cl. 424-70.000.
Okumura, Takeshi; Nakanishi, Kiyoshi; and Nakajima, Mikio, to Toyota Jidosha Kabushiki Kaisha. Helically-shaped intake port of an internal-combustion engine. 4,516,544, Cl. 123-188.00M.
Okuyama, Hirofumi: *See*—
Ikegami, Kasumi; and Okuyama, Hirofumi, 4,517,266, Cl. 430-2.000.
Olesen, Jorgen E. Transparent panel for curved walls in revolving doors. 4,516,369, Cl. 52-204.000.
Olfert, Abram J. Bale discharge pressure plate. 4,516,492, Cl. 100-192.000.
Olin Corporation: *See*—
Fiorucci, Louis C.; and Gregory, Kevin M., 4,517,164, Cl. 423-184.000.
Gaule, Gerhart K.; Yarwood, John C.; and Tyler, Derek E., 4,516,627, Cl. 164-467.000.
Yarwood, John C.; and Tyler, Derek E., 4,516,625, Cl. 164-454.000.
Oliver, Michael J.: *See*—
Wnuk, Paul A.; Hamilton, Thomas J.; Trassare, Anthony, Jr.; and Oliver, Michael J., 4,516,891, Cl. 410-154.000.
Olumpus Optical Company Limited: *See*—
Kimura, Kenji, 4,517,611, Cl. 360-33.100.
Olympus Optical Company Limited: *See*—
Galle, Kevin; Orimo, Ryoichi; Sakurada, Masahiko; Banno, Taiichi; and Manabe, Sugio, 4,517,160, Cl. 422-65.000.
Nakahashi, Ken-ichi; and Mihara, Shin-ichi, 4,516,840, Cl. 350-515.000.
Nishikawa, Masaji, 4,516,850, Cl. 355-15.000.
Omure, Yukio: *See*—
Hisamoto, Iwao; Omure, Yukio; and Ishikawa, Sueyoshi, 4,517,108, Cl. 252-162.000.
O'Neill, Nelson L.: *See*—
Ungar, Israel S.; Scher, Herbert I.; and O'Neill, Nelson L., 4,517,235, Cl. 428-148.000.
Oneyama, Naotake; and Yoshikawa, Akihisa, to Shokestu Kinzoku Kogyo Kabushiki Kaisha. Cylinder driving system. 4,516,473, Cl. 91-462.000.
Onishi, Kimimasa; Takahashi, Takao; and Koriyama, Masayuki, to Nissan Motor Co., Ltd. Weft picking device of air jet weaving loom. 4,516,610, Cl. 139-435.000.
Ono, Terumichi: *See*—
Oka, Ken-ichiro; Mineo, Masatoshi; and Ono, Terumichi, 4,517,149, Cl. 264-210.800.
Onodera, Kaoru: *See*—
Kagawa, Nobuaki; Fujimori, Noboru; Tanaka, Shigeo; and Onodera, Kaoru, 4,517,284, Cl. 430-591.000.
Oohashi, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Ignition coil device for internal combustion engine. 4,516,558, Cl. 123-634.000.
Oohashi, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Ignition coil device for internal combustion engine. 4,516,559, Cl. 123-634.000.
Oppenlaender, Knut; Stork, Karl; and Barthold, Klaus, to BASF Aktiengesellschaft. Inhibitors against corrosion caused by $CO_2$ and $H_2S$ in water-in-oil emulsions. 4,517,114, Cl. 252-389.00R.
Orimo, Ryoichi: *See*—
Galle, Kevin; Orimo, Ryoichi; Sakurada, Masahiko; Banno, Taiichi; and Manabe, Sugio, 4,517,160, Cl. 422-65.000.
Orosei, Mario, to Fadis S.p.A. Apparatus for reversing hose. 4,516,703, Cl. 223-39.000.
Ortlieb, Robert M., to DeVlieg Machine Company. Precision adjustable cutting tool. 4,516,889, Cl. 408-152.000.
Osawa, Yoshinori. Apparatus for tile-setting. 4,516,373, Cl. 52-387.000.
Osborne, Robert L.: *See*—
Kemper, Christian T.; Osborne, Robert L.; and Bellows, James C., 4,517,468, Cl. 290-52.000.
Oscar Mayer Foods Corporation: *See*—
Kress, Jack L., 4,517,207, Cl. 426-315.000.
Oscobal AG: *See*—
Mittelmeier, Heinz; Moser, Heinz; and Leu, Beat, 4,516,276, Cl. 3-1.910.
Otis Engineering Corporation: *See*—
Canalizo, Carlos R., 4,516,917, Cl. 417-390.000.
Pitts, Glen E., 4,516,634, Cl. 166-120.000.
Otsuka Chemical Co., Ltd.: *See*—
Tadashi, Ii; and Saichi, Egusa, 4,517,018, Cl. 75-129.000.
Otsuka Pharmaceutical Co., Ltd.: *See*—
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, 4,517,180, Cl. 514-16.000.
Otte, Henning: *See*—
Heinrich, Wulf-Dieter; and Otte, Henning, 4,517,506, Cl. 318-807.000.
Otter, Brian: *See*—
Maczuszenko, Andrzej; Davison, Ernest; Otter, Brian; Whittaker, Brian F.; Novak, Christopher; and Landheer, Dolf, 4,516,847, Cl. 355-3.0TR.
Otto, Lee W.; Ingold, John H.; and Bergman, Rolf S., to General Electric Company. Incandescent lamp source utilizing an integral cylindrical transparent heat mirror. 4,517,491, Cl. 313-579.000.
Oudet, Claude, to Portescap. Electric stepper motor. 4,517,478, Cl. 310-49.00R.
Outboard Marine Corporation: *See*—
Hicks, John E.; and Kubat, James J., 4,516,638, Cl. 172-22.000.
Nerstrom, James S., 4,516,540, Cl. 123-65.0PE.
Outlaw, Ronald A.; and Baugh, Bill T., to United States of America, National Aeronautics and Space Administration. Precision manipulator heating and cooling apparatus for use in UHV systems with sample transfer capability. 4,516,435, Cl. 73-863.110.
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., to Sovonics Solar Systems. Method of making amorphous semiconductor alloys and devices using microwave energy. 4,517,223, Cl. 427-39.000.
Owen, Wickersham & Erickson: *See*—
Lindberg, John E., 4,516,553, Cl. 123-568.000.
Owens-Corning Fiberglas Corporation: *See*—
Bhatti, Mohinder S.; Porzio, Thomas J.; and Nagy, Monte L., 4,516,995, Cl. 65-1.000.
Ferguson, Larry W.; and McFarland, Roger A., 4,517,323, Cl. 523-514.000.
Willard, G. Fred; and Hutchings, David A., 4,516,996, Cl. 65-3.430.
Owens-Illinois: *See*—
Babington, Robert S., 4,516,928, Cl. 431-12.000.
Owens-Illinois, Inc.: *See*—
Byrum, Bernard W., Jr.; and Ernsthausen, Roger E., 4,517,492, Cl. 313-587.000.
Nelson, Frederick J.; and Richards, Ray S., 4,516,934, Cl. 432-30.000.
Owens, Joseph M.: *See*—
Zdanowski, Richard E.; and Owens, Joseph M., 4,517,330, Cl. 524-408.000.
Owoc, James R., to Kerotest Manufacturing Corp. Bent bellows sealed rotary valve. 4,516,754, Cl. 251-335.00B.
Oya, Masayuki: *See*—
Iso, Tadashi; and Oya, Masayuki, 4,517,123, Cl. 260-239.30R.
Ozaki, Keiichiro: *See*—
Sumida, Atsushi; Ozaki, Keiichiro; and Watanabe, Shizuo, 4,517,169, Cl. 423-447.400.

Ozawa, Kazuo: *See*—
Fujiwara, Hiroshi; Yamazaki, Hatsutaro; and Ozawa, Kazuo, 4,517,349, Cl. 526-313.000.

Ozeki, Mineo: *See*—
Yuki, Katsumi; Yoshida, Susumu; Ozeki, Mineo; Miyazaki, Yasuyuki; and Kawamata, Masaru, 4,517,645, Cl. 364-424.000.

P D Manufacturing, Inc.: *See*—
Stawski, Karl-Heinz; and Jensen, Philip W., 4,516,561, Cl. 126-25.00B.

Pachmayer Gun Works, Inc.: *See*—
Farrar, Frank W.; and Cupp, Carl J., 4,516,346, Cl. 42-50.000.

Paek, Un-Chul, to AT&T Technologies, Inc. Single mode lightguide fiber having a trapezoidal refractive index profile. 4,516,826, Cl. 350-96.310.

Pagani, Sergio M.: *See*—
Kaljee, Jan; Lalor, Leo J.; Pagani, Sergio M.; and Robinson, Frederick P. A., 4,517,441, Cl. 219-146.230.

Pagano, Michele; and Palumbo, Nicola. Framework block or brick consisting of modular elements of formed sheet steel or aluminum and comprising jointing means. 4,516,375, Cl. 52-581.000.

Pako Corporation: *See*—
Willenbring, Armer J., 4,516,386, Cl. 53-520.000.

Pakus, Edward: *See*—
Cohen, Howard; and Pakus, Edward, 4,516,325, Cl. 33-138.000.

Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., to Stauffer Chemical Company. Herbicide compositions. 4,517,012, Cl. 71-94.000.

Palmer, Kenneth J.; Brandyberry, Dennis R.; and Rye, Grover W., to Goodyear Tire & Rubber Company, The. Metallic cable for reinforcing elastomeric articles. 4,516,395, Cl. 57-237.000.

Palumbo, Nicola: *See*—
Pagano, Michele; and Palumbo, Nicola, 4,516,375, Cl. 52-581.000.

Pan Communications, Inc.: *See*—
Konomi, Masao, 4,516,428, Cl. 73-585.000.

Pankratz, David P. Magnetic motor. 4,517,477, Cl. 310-23.000.

Panush, Sol, to Inmont Corporation. Super jet black coatings. 4,517,249, Cl. 428-463.000.

Papst Motoren GmbH & Co, KG: *See*—
Muller, Rolf, 4,517,480, Cl. 310-68.00R.

Paradyne Corporation: *See*—
Betts, William; and Smith, Wesley H., 4,517,680, Cl. 375-75.000.

Paradysz, Jean M.: *See*—
Milford, Edgar L.; Carpenter, Charles B.; and Paradysz, Jean M., 4,517,289, Cl. 435-7.000.

Parham, Walter J., Jr. Control and guidance apparatus for use with powered tools. 4,516,453, Cl. 83-471.300.

Paris, Jay E.: *See*—
MacPherson, David B.; Paris, Jay E.; Foley, Robert W.; Greinier, Martin W.; and Pulsifer, David N., 4,516,281, Cl. 4-319.000.

Parker Chemical Company: *See*—
Lindert, Andreas, 4,517,028, Cl. 148-6.14R.
Sonoda, Sakae; Nagae, Yoshio; and Kano, Seishi, 4,517,029, Cl. 148-6.15Z.

Parker, Dane K.; Kuczkowski, Joseph A.; and Kimball, Michael E., to Goodyear Tire & Rubber Company, The. Activating plasticizer for urethane prepolymers and complex of alkali metal salt with 4,4'-methylenedianiline. 4,517,331, Cl. 524-451.000.

Parker, John C.; and Blake, James A. Velocity measurement. 4,516,851, Cl. 356-28.000.

Parks, Gerald: *See*—
Gregory, John R.; Parks, Gerald; and Dondero, John D., 4,516,273, Cl. 2-2.000.

Parmley, Thomas A.: *See*—
Cavanaugh, James E.; Hetherington, Robert D.; and Parmley, Thomas A., 4,516,725, Cl. 239-127.000.

Parrock, Joseph J., to American Standard Inc. Changeable keylock having tumblers with shiftable pivot seats. 4,516,417, Cl. 70-384.000.

Pastusek, Paul E.: *See*—
Childers, John S.; and Pastusek, Paul E., 4,516,642, Cl. 175-340.000.

Patient, Lucien, to Les Robinets Presto. Faucet mixer. 4,516,607, Cl. 137-637.400.

Paton, H. Neil. Articulated intermodal flatcar. 4,516,506, Cl. 105-3.000.

Patsch, Manfred: *See*—
Graser, Fritz; Hoffmann, Gerhard; Leyrer, Reinhold J.; Neumann, Peter; and Patsch, Manfred, 4,517,270, Cl. 430-58.000.

Paul, Robert J.: *See*—
Fotiadis, Emanuel; Kozol, Edward J.; Leung, Tak L.; and Paul, Robert J., 4,516,678, Cl. 206-444.000.

Pavitt, William H., Jr. Telephone triggered switching system for transcriber. 4,517,413, Cl. 179-81.00R.

Pavlic, John C.: *See*—
Preschutti, Joseph P.; and Pavlic, John C., 4,517,521, Cl. 330-2.000.

Paynter, Alan H., to Incom International Inc. Flexible remote control with improved anchoring of outer ball races. 4,516,441, Cl. 74-501.00R.

Pearson, James E., to United Technologies Corporation. Laser radar adaptive tracking system. 4,516,853, Cl. 356-152.000.

Pedersen, Kristen I., to Sofec, Inc. Tower mounted mooring apparatus. 4,516,942, Cl. 441-5.000.

Pedroso, Raul I.; and Coulter, Robert S., to Coulter Corporation. Microsample handling apparatus. 4,516,437, Cl. 73-864.220.

Peelman, Harold E.: *See*—
Richter, Albert P., Jr.; and Peelman, Harold E., 4,517,459, Cl. 250-261.000.

Pegram, Warren J., to AMP Incorporated. Self-centering cable fastener. 4,517,408, Cl. 174-153.00G.

Peiffer, Dennis G.: *See*—
Duvdevani, Ilan; Peiffer, Dennis G.; Eckert, John A.; and Lundberg, Robert D., 4,516,982, Cl. 44-62.000.
Lundberg, Robert D.; Phillips, Robert R.; and Peiffer, Dennis G., 4,517,333, Cl. 524-516.000.

Peleckis, Anthony J., to Warner-Lambert Company. Dynamic razor. 4,516,320, Cl. 30-49.000.

Pennini, Gianni: *See*—
Cuffiani, Illaro; Longi, Paolo; Zucchini, Umberto; and Pennini, Gianni, 4,517,307, Cl. 502-119.000.

Pennwalt Corporation: *See*—
Griffith, Ronald C., 4,517,187, Cl. 514-250.000.
Raghunathan, Yegnasawami, 4,517,179, Cl. 514-249.000.

Pepper, William, Jr.: *See*—
Schalkowsky, Samuel; and Pepper, William, Jr., 4,517,292, Cl. 435-32.000.

PepsiCo, Inc.: *See*—
Szerenyi, Peter; and Ringleib, Colin J., 4,517,135, Cl. 261-104.000.

Perfetti, Bruno M., to United States Steel Corporation. Corrosion resistant core-plate and coatings therefor. 4,517,325, Cl. 524-188.000.

Perkin-Elmer Corp., The: *See*—
Liu, Raymond C.; and Markle, David A., 4,516,852, Cl. 356-121.000.

Pernicano, Vincent S. Transfer including substrate with deformable thermoplastic coat. 4,517,237, Cl. 428-198.000.

Perrault, Guy: *See*—
Duchesne, Gonzague L.; and Perrault, Guy, 4,517,035, Cl. 149-19.920.

Perrucchini, Vincenzo: *See*—
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Perry, John A.: *See*—
Simpson, Carolyn N.; and Perry, John A., 4,516,679, Cl. 206-459.000.

Perthus, Peter: *See*—
Dieffenbach, Rudiger; Grunwald, Werner; Perthus, Peter; and Prinzhausen, Friedrich, 4,517,630, Cl. 362-268.000.

Pertot, Fulvio: *See*—
Mercati, Giorgio; Mariano, Armando; Pertot, Fulvio; Glionna, Antonio; and Ferri, Mario, 4,517,355, Cl. 528-287.000.

Pesa, Frederick A.; Blaskie, Marcus W.; and Fox, Joseph R. Decarbonylation of N-butyraldehyde using zeolite catalysts. 4,517,400, Cl. 585-638.000.

Pesho, Stephen W.: *See*—
Buckner, Leonard; Foll, William A., Sr.; and Pesho, Stephen W., 4,516,380, Cl. 53-282.000.

Peters, Gerd, to H. Wohlenberg KG GmbH & Co. Three-knife trimmer. 4,516,455, Cl. 83-519.000.

Peterson, LuVerne R., to Burroughs Corporation. High-speed, compact magnetic bubble stretcher. 4,517,662, Cl. 365-44.000.

Petrich, Dennis M.; Amick, Christopher G.; and Gruenenwald, Stanley L., to Micro Component Technology, Inc. Integrated circuit test apparatus test head. 4,517,512, Cl. 324-73.00R.

Petruccelli, Frank: *See*—
May, Joseph R.; Petruccelli, Frank; Lang, Robert L.; and de Haan, Herman P., 4,517,231, Cl. 428-35.000.

Pettersson, Klas A. Cloth fastener. 4,516,297, Cl. 24-498.000.

Petty, Cleon, to Motorola, Inc. Master-slave flip-flop arrangement with slave section having a faster output transistion and a greater resistance to output degradation. 4,517,475, Cl. 307-272.00A.

Pfahl, Siegfried: *See*—
Meistring, Rolf; Siegling, Hans-Friedrich; and Pfahl, Siegfried, 4,516,831, Cl. 350-96.230.

Pfeifer, Robert F.: *See*—
Turi, Raymond A.; and Pfeifer, Robert F., 4,516,313, Cl. 29-571.000.

Pfizer Inc.: *See*—
Brennan, Thomas M.; and Hendrick, Michael E., 4,517,379, Cl. 564-193.000.
Kellogg, Michael S., 4,517,126, Cl. 260-245.20R.

Pfleiderer, Hans-Joerg; and Grassl, Gerhard, to Siemens Aktiengesellschaft. Method and arrangement for an operational check of a programmable logic array. 4,517,672, Cl. 371-27.000.

Pfluger, Fernando: *See*—
Fauvarque, Jean-Francois; Jutand, Anny; Chevrot, Claude; Pfluger, Fernando; and Troupel, Michel, 4,517,061, Cl. 204-59.00R.

Pfluger, Gerhard, to Robert Bosch GmbH. Vehicular-type alternator with speed-responsive fan coupling. 4,517,482, Cl. 310-78.000.

Phelps, Frankie E.: *See*—
Francis, Thomas L.; and Phelps, Frankie E., 4,517,037, Cl. 156-89.000.

Philip Morris Incorporated: *See*—
Rainer, Norman B.; and McClung, Charles S., 4,516,589, Cl. 131-331.000.
Teng, Daniel M., 4,516,590, Cl. 131-352.000.

Phillips, Edward H., to Hidden Valley Associates, Inc. Flexible shaft coupling device. 4,516,958, Cl. 464-153.000.

Phillips Petroleum Co.: *See*—
Kukes, Simon G.; and Banks, Robert L., 4,517,401, Cl. 585-645.000.

Phillips, Robert R.: *See*—
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Piat, Rene : *See*—
Muller, Bernard; Piat, Rene ; Rensing, Cornelis; and Trajin, Jean-Paul, 4,517,362, Cl. 546-7.000.

Pichler, Rudolf. Adjustable stairway element. 4,516,368, Cl. 52-190.000.

Pieper, Kurt; and Scharpenberg, Rainer, to Krautkramer GmbH; and Brown Boveri Reaktor GmbH. Method of testing fuel element tubes for defects. 4,517,152, Cl. 376-252.000.

Piepmeier, Edward H. Multi-electrode plasma source. 4,517,495, Cl. 315-111.210.

Pierret, Gabriel L.: *See—*
Pierret, Luc A., deceased; Robert, Joseph, administrator; Pierret, Hubert; Pierret, Gabriel L.; Pierret, Maurice J.; and Pierret, Jean-Marie M., 4,516,734, Cl. 241-283.000.

Pierret, Hubert: *See—*
Pierret, Luc A., deceased; Robert, Joseph, administrator; Pierret, Hubert; Pierret, Gabriel L.; Pierret, Maurice J.; and Pierret, Jean-Marie M., 4,516,734, Cl. 241-283.000.

Pierret, Jean-Marie M.: *See—*
Pierret, Luc A., deceased; Robert, Joseph, administrator; Pierret, Hubert; Pierret, Gabriel L.; Pierret, Maurice J.; and Pierret, Jean-Marie M., 4,516,734, Cl. 241-283.000.

Pierret, Luc A., deceased; by Robert, Joseph, administrator; Pierret, Hubert; Pierret, Gabriel L.; Pierret, Maurice J.; and Pierret, Jean-Marie M. Method for loading automatically machines for treating bulk materials and device for working such method. 4,516,734, Cl. 241-283.000.

Pierret, Maurice J.: *See—*
Pierret, Luc A., deceased; Robert, Joseph, administrator; Pierret, Hubert; Pierret, Gabriel L.; Pierret, Maurice J.; and Pierret, Jean-Marie M., 4,516,734, Cl. 241-283.000.

Pincon, Andrew J. Activated air and ion exchange treatment of water. 4,517,084, Cl. 210-169.000.

Pineau, Jean, to Le Materiel de Voirie, Sarl. Pick-up sweeper of the type with elevating conveyor with dirt distributing device in the dirt collecting receptacle. 4,516,285, Cl. 15-84.000.

Pinheiro, Edwin J., to International Business Machines Corporation. Lookahead I/O device control subsystem. 4,517,641, Cl. 364-200.000.

Pinkham, Jesse R., to R. J. Reynolds Tobacco Company. Method and apparatus for producing a multiple-blend cigarette. 4,516,585, Cl. 131-84.300.

Piotroski, Peter N.: *See—*
Gomes, John M.; and Piotroski, Peter N., 4,517,650, Cl. 364-478.000.

Pircher, Donna S.; and Pircher, Reinhold A. Discoidal amusement device. 4,516,947, Cl. 446-46.000.

Pircher, Reinhold A.: *See—*
Pircher, Donna S.; and Pircher, Reinhold A., 4,516,947, Cl. 446-46.000.

Pischke, La Monte D.: *See—*
Shoaf, Myron D.; and Pischke, La Monte D., 4,517,214, Cl. 426-548.000.

Pitney Bowes Inc.: *See—*
Beck, Christian A.; and Eckert, Alton B., 4,516,494, Cl. 101-93.260.
Gomes, John M.; and Piotroski, Peter N., 4,517,650, Cl. 364-478.000.

Pitts, Glen E., to Otis Engineering Corporation. Hydraulic running and setting tool for well packer. 4,516,634, Cl. 166-120.000.

Piwonka, Fridolin: *See—*
Buck, Rainer; Kuttner, Thomas; Piwonka, Fridolin; and Wessel, Wolf, 4,516,550, Cl. 123-357.000.

Plante, Stuart E.; and Hess, Susan V., to Amchem Products, Inc. Method for removing sealant contamination. 4,517,025, Cl. 134-38.000.

Plastic Specialties and Technologies, Inc.: *See—*
Dieckmann, Dale J.; and Fletcher, Charles W., 4,517,115, Cl. 252-400.00R.

Plastics Engineering Company: *See—*
D'Alelio, Gaetano F., deceased, 4,517,354, Cl. 528-172.000.
D'Alelio, Gaetano F., deceased; and Waitkus, Phillip A., 4,517,363, Cl. 546-66.000.
D'Alelio, Gaetano F., deceased; and Waitkus, Phillip A., 4,517,364, Cl. 546-66.000.

Plaziaud, Alain, to Novatome. Device for removing cooling fluid, making it possible to locate defective arrays in a nuclear reactor in operation. 4,517,153, Cl. 376-253.000.

Polanyi, Michael L. Continuous blood gas monitoring. 4,516,580, Cl. 123-632.000.

Polaroid Corporation: *See—*
Blakely, Linda L.; Goodman, John C.; and Walker, David B., 4,516,845, Cl. 354-412.000.
Kee, Richard C.; and Norris, Philip R., 4,516,844, Cl. 354-275.000.
Kisler, Semyon, 4,517,143, Cl. 264-22.000.

Pomerantz, Julie; and Feeney, Paul. Slicing device for foodstuffs. 4,516,458, Cl. 83-651.100.

Pon, Chuck Y., to Dalmo Victor Operations, Bell Aerospace Textron, Div. of Textron, Inc. High speed high power step attenuator method and apparatus. 4,517,535, Cl. 333-81.00A.

Popelka, Susan R., to Abbott Laboratories. Optical apparatus for fluorescence polarization instrument. 4,516,856, Cl. 356-368.000.

Popescu, Miron; and Gunsalus, Edward K., to Johnson & Johnson. Continuous removal of ethylene oxide from gaseous streams. 4,517,167, Cl. 423-245.000.

Poran, Michael; Langner, Carl; and Tobiasz, Chester C., to Concast Incorporated. Mold assembly for continuous casting. 4,516,624, Cl. 164-418.000.

Portescap: *See—*
Oudet, Claude, 4,517,478, Cl. 310-49.00R.

Porzio, Thomas J.: *See—*
Bhatti, Mohinder S.; Porzio, Thomas J.; and Nagy, Monte L., 4,516,995, Cl. 65-1.000.

Pou, Frederick M.; and Straub, Richard L., to Monarch Marking Systems, Inc. Printer with automatic stacker. 4,516,497, Cl. 101-240.000.

PPG Industries, Inc.: *See—*
Birkmeyer, William J.; Gray, Ralph C.; Dowbenko, Rostyslaw; Kapp, David C.; VanBuskirk, Ellor J.; and Maska, Rudolf, 4,517,322, Cl. 523-501.000.

Prakash, Sri; and Snyder, William B., Jr., to Union Carbide Corporation. Copper base metal termination for multilayer ceramic capacitors. 4,517,155, Cl. 419-19.000.

Preschutti, Joseph P.; and Pavlic, John C., to C-COR Electronics, Inc. Feed forward circuit and a method for aligning and balancing the same. 4,517,521, Cl. 330-2.000.

Preston, John M.; Ward, Thomas V.; and Morrow, William H., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Correlation spectrometer for nerve agents. 4,516,857, Cl. 356-418.000.

Pretty Products, Inc.: *See—*
Bell, Ted A., 4,516,682, Cl. 211-59.100.

Price, Frank C.; Tout, Nigel R.; Hanson, Raymond; and Tillyard, Malcolm, to USM Corporation. Shoe part heating apparatus. 4,517,442, Cl. 219-215.000.

Price, Robert B.: *See—*
Bennett, Ross L.; Price, Robert B.; Springen, Clyde H.; and Kilbourn, Harlan C., 4,517,652, Cl. 364-513.000.

Prince, Jack A.; and Standridge, Bobby D., to Jack Prince, Inc. Deboning apparatus having auger seal on one end and support means therefor. 4,516,731, Cl. 241-24.000.

Prinzhausen, Friedrich: *See—*
Dieffenbach, Rudiger; Grunwald, Werner; Perthus, Peter; and Prinzhausen, Friedrich, 4,517,630, Cl. 362-268.000.

Procter & Gamble Company, The: *See—*
Barker, Dale E., 4,516,689, Cl. 220-335.000.
Volpenhein, Robert A., 4,517,360, Cl. 536-119.000.

Protocol Engineering Limited: *See—*
Elworthy, John H.; and Mayston, Donald, 4,517,036, Cl. 156-64.000.

Provisor, Zvi; and Burford, Henry H. T., Jr., to Crosfield Data Systems, Inc. Apparatus and method of microprocessor-controlling laser scanning of a material held by a transport, the loading and unloading of the transport also being microprocessor-controlled. 4,517,638, Cl. 364-146.000.

Prudhomme, Malcolm J. Advanced dual-filtering apparatus. 4,517,082, Cl. 210-117.000.

Prunbauer, Kurt; and Csapo, Erich, to Evva-Werk Spezialerzeugung von Zylinder- und Sicherheitsschlossern Gesellschaft m.b.H. & Co. Kommanditgesellschaft. Locking device and key. 4,516,416, Cl. 70-276.000.

Prusak, John J.: *See—*
Westerman, Harry H., Jr.; and Prusak, John J., 4,516,301, Cl. 29-27.00C.

Przybysz, John X.; and Schlegel, Earl S., deceased (by Schlegel, Barbara W., Administratrix), to Westinghouse Electric Corp. Method of making a self-protected thyristor. 4,516,315, Cl. 29-576.00B.

Pulsifer, David N.: *See—*
MucPherson, David B.; Paris, Jay E.; Foley, Robert W.; Greinier, Martin W.; and Pulsifer, David N., 4,516,281, Cl. 4-319.000.

Pyles Division: *See—*
Guzowski, Raymond J., 4,516,700, Cl. 222-330.000.

Quantum Systems Corporation: *See—*
Miller, Wendell R., 4,517,088, Cl. 210-411.000.

Quay, Earl R., to Mayer, Rothkopf Industries, Inc. Wire-covered doffer for sliver high pile fabric knitting machines. 4,516,292, Cl. 19-112.000.

Quest Corporation: *See—*
Wetzel, Donald C., 4,516,645, Cl. 177-147.000.

Quill Licensing: *See—*
Crimmins, Arthur G., Jr., 4,516,939, Cl. 434-114.000.

Quinn, Jeffrey J.: *See—*
Jenkins, Robert D., 4,516,341, Cl. 40-152.000.

R. J. Reynolds Tobacco Company: *See—*
Pinkham, Jesse R., 4,516,585, Cl. 131-84.300.

R. T. Vanderbilt Company, Inc.: *See—*
Hoffman, David M.; Feher, John J.; and Farmer, Homer H., 4,517,103, Cl. 252-28.000.

Raasch, Hans; and Wassenhoven, Heinz-Georg, to W. Schlafhorst & Co. Method and device for increasing the hairiness and the bulkiness of a thread. 4,516,397, Cl. 57-417.000.

Raasch, Hans: *See—*
Stahlecker, Fritz; and Raasch, Hans, 4,516,396, Cl. 57-407.000.

Rach, Heinz-Dieter: *See—*
Seitz, Hans; Frerichs, Udo; Rach, Heinz-Dieter; and Spendel, Siegmund, 4,516,617, Cl. 157-1.000.

Rachi, Masahiro: *See—*
Fushimoto, Hideo; Toyomura, Shigeru; Nishimuro, Yoshiaki; Asakura, Osamu; and Rachi, Masahiro, 4,517,660, Cl. 364-708.000.

Radecca, Inc.: *See—*
Beall, Gary W., 4,517,094, Cl. 210-664.000.

Radiant Technology Corporation: *See—*
Crain, N. Robert; and Richert, Carson T., 4,517,448, Cl. 219-388.000.

Rafaeli, Gilad. Egg-collection system. 4,516,532, Cl. 119-48.000.

Raghunathan, Yegnasawami, to Pennwalt Corporation. Rapid dissolving, uniform drug compositions and their preparation. 4,517,179, Cl. 514-249.000.

Ragland, Frank R., Jr., to RCA Corporation. Method for screening line screen slit mask color picture tubes. 4,516,841, Cl. 354-1.000.

Rahdener Maschinenfabrik August Kolbus: *See*—
Rathert, Horst, 4,516,960, Cl. 474-49.000.

Rainer, Norman B.; and McClung, Charles S., to Philip Morris Incorporated. Non-combustible carbonized cigarette filters. 4,516,589, Cl. 131-331.000.

Ralston Purina Company: *See*—
Snetsinger, David C.; Engster, Henry M.; and Stiebler, Dwaine D., 4,516,531, Cl. 119-18.000.

Ramanathan, Visvanathan, to Ciba-Geigy Corporation. Disazo bisbenzthiazolyl compounds. 4,517,358, Cl. 534-608.000.

Rao, Krishna K.: *See*—
Yang, Tai-Cheng; Rao, Krishna K.; and Huang, I-Der, 4,517,371, Cl. 549-239.000.

Ratcliffe, Charles T.; and Tromp, Petrus J., to Exxon Research and Engineering Co. Synthesis of $H_2$ and $CH_4$ from $H_2S$ and CO. 4,517,171, Cl. 423-648.00R.

Rathert, Horst, to Rahdener Maschinenfabrik August Kolbus. Variable speed chain drive. 4,516,960, Cl. 474-49.000.

Rathmann, Dietrich: *See*—
Schmidt, Manfred; Rathmann, Dietrich; and Reinking, Klaus, 4,517,328, Cl. 524-370.000.

Rauma-Repola Oy: *See*—
Drockila, Kalevi, 4,516,526, Cl. 118-697.000.

Rawlings, David L., to International Hydron Corporation. Retaining means for device for centrifugally casting symmetrical or asymmetrical articles. 4,516,924, Cl. 425-434.000.

Rawlings, David L.; and Glick, Robert E., to International Hydron Corporation. Device and method for centrifugally casting articles. 4,517,138, Cl. 264-2.100.

Rawlings, David L.; and Glick, Robert E., to International Hydron Corporation. Device and method for centrifugally casting articles on a continuous basis. 4,517,139, Cl. 264-2.100.

Rawlings, David L., to International Hydron Corporation. Device and method for centrifugally casting articles. 4,517,140, Cl. 264-2.100.

Ray, Jeremiah B.: *See*—
Marshall, Charles A.; and Ray, Jeremiah B., 4,516,968, Cl. 604-174.000.

Raychem Corporation: *See*—
Chazan, David; and Katila, Michael J., 4,517,449, Cl. 219-549.000.
Read, Michael R.; and Corke, Nicholas T., 4,517,340, Cl. 525-113.000.

RCA Corporation: *See*—
Balaban, Alvin R.; and Steckler, Steven A., 4,517,586, Cl. 358-13.000.
Ditty, Lawrence H., 4,517,224, Cl. 427-64.000.
Glock, Thomas L.; and Credelle, Thomas L., 4,517,489, Cl. 313-422.000.
Labib, Mohamed E.; and Wang, Chin C., 4,517,117, Cl. 252-511.000.
Murphy, Wesley W., III; and Hettiger, James, 4,517,602, Cl. 358-198.000.
Ragland, Frank R., Jr., 4,516,841, Cl. 354-1.000.
Reitmeier, Glenn A., 4,517,600, Cl. 358-166.000.
Westerman, Harry H., Jr.; and Prusak, John J., 4,516,301, Cl. 29-27.00C.

Rea, Samuel N.: *See*—
Wakefield, G. Felix; Bender, David L.; and Rea, Samuel N., 4,517,049, Cl. 156-622.000.

Read, Michael R.; and Corke, Nicholas T., to Raychem Corporation. Adhesive composition. 4,517,340, Cl. 525-113.000.

Rebhan, Dieter, to Linde Aktiengesellschaft. Tunnel constructing. 4,516,878, Cl. 405-130.000.

Redicon Corporation: *See*—
Bulso, Joseph D., Jr.; Doyle, Stephen D.; and McClung, James A., 4,516,420, Cl. 72-329.000.

Redington, Rowland W., to General Electric Company. NMR blood flow imaging. 4,516,582, Cl. 128-653.000.

Reed Rock Bit Company: *See*—
Childers, John S.; and Pastusek, Paul E., 4,516,642, Cl. 175-340.000.

Reese, Dirk; and Rigler, Josef K., to Chemische Werke Huls AG. Fine particulate, expandable styrene polymers suitable for the production of rapidly mold-ejected cellular bodies. 4,517,314, Cl. 521-59.000.

Reich, George, to Unibody Time Saver Corporation. Vehicle frame clamping and support apparatus. 4,516,423, Cl. 72-422.000.

Reich, Karl, to Teroson GmbH. Method of preparing sulfonyl isocyanates. 4,517,133, Cl. 260-545.00R.

Reid, Norman C. Rowing outrigger. 4,516,941, Cl. 440-105.000.

Reid, Timothy H.: *See*—
Taylor, Michael N.; and Reid, Timothy H., 4,517,147, Cl. 264-83.000.

Reilich, David G.: *See*—
Jenkins, Robert D., 4,516,341, Cl. 40-152.000.

Reim, Paul. Arrangement for exchangeably framing pictures. 4,516,342, Cl. 40-156.000.

Reiner, Norbert L.: *See*—
Berger, Hans S.; Mercurio, Frank; and Reiner, Norbert L., 4,516,648, Cl. 180-6.660.

Reinitz, Karl; and Hart, Lynn, to United States of America, Navy. Magnetometer with a solid-state magnetic-field sensing means. 4,517,515, Cl. 324-252.000.

Reinking, Klaus: *See*—
Schmidt, Manfred; Rathmann, Dietrich; and Reinking, Klaus, 4,517,328, Cl. 524-370.000.

Reisgies, Rolf W.; and Camren, Robert, to Germania Dairy Automation, Inc. Milk sweep method and apparatus for automated milking systems. 4,516,530, Cl. 119-14.080.

Reiss, Harald; and Ziegenbein, Botho, to Brown, Boveri & Cie AG. High-temperature storage battery. 4,517,263, Cl. 429-120.000.

Reitemeyer, Otto: *See*—
Obenaus, Fritz; Nierlich, Franz; Reitemeyer, Otto; and Scholz, Bernhard, 4,517,395, Cl. 585-259.000.

Reitmeier, Glenn A., to RCA Corporation. Error concealment system using dropout severity information for selection of concealment method. 4,517,600, Cl. 358-166.000.

Rekuperator KG Dr.-Ing. Schack & Co.: *See*—
Winter, Karl, 4,516,985, Cl. 55-18.000.
Winter, Karl, 4,516,988, Cl. 55-59.000.

Reliance Universal, Inc.: *See*—
Matejka, Robert C.; and Moretz, Nellie M., 4,517,228, Cl. 427-370.000.

Remington, William R.: *See*—
Krahler, Stanley E.; and Remington, William R., 4,517,376, Cl. 560-87.000.

Renal Systems, Inc.: *See*—
Amiot, Bruce P.; Fuller, Larry E.; Martinez, Felix J.; Cosentino, Louis C.; Harm, William H.; and Nelson, Wayne L., 4,517,081, Cl. 210-85.000.

Renken, Terry L.: *See*—
Sanderson, John R.; Watts, Lewis W., Jr.; and Renken, Terry L., 4,517,374, Cl. 549-533.000.

Rensing, Cornelis: *See*—
Muller, Bernard; Piat, Rene ; Rensing, Cornelis; and Trajin, Jean-Paul, 4,517,362, Cl. 546-7.000.

Rensselaer Polytechnic Institute: *See*—
Scarton, Henry A.; DiBianca, John A.; Lacey, James A.; and Kennedy, Warren C., 4,516,658, Cl. 181-208.000.

Research and Development Institute, Inc. at Montana State University: *See*—
Strobel, Gary A.; Gavlak, Andrea H.; and Jaynes, Jesse M., 4,517,008, Cl. 71-77.000.

Reske, Eckart; and Wolters, Ernst, to Hoechst Aktiengesellschaft. Toughened polyoxymethylene and shaped articles produced therefrom. 4,517,319, Cl. 523-200.000.

Reynolds Industries Inc.: *See*—
Malone, Edgar W., 4,517,497, Cl. 315-241.00R.

Reynolds & Laurence Industries Limited: *See*—
Laurence, Roger F., 4,517,415, Cl. 179-107.0FD.

Reynolds Metals Company: *See*—
Arfert, Horst F. W., 4,516,383, Cl. 53-410.000.

Rheinmetall GmbH: *See*—
Klein, Klaus-Walter; Bocker, Jurgen; Glotz, Gerhard; and Gersbach, Klaus, 4,516,502, Cl. 102-523.000.

Rhone-Poulenc Inc.: *See*—
Theissen, Robert J., 4,517,010, Cl. 71-90.000.

Rhone-Poulenc Specialites Chimiques: *See*—
Cassat, Robert, 4,517,227, Cl. 427-96.000.

Ribault, Michel: *See*—
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.

Ricciardi, Mario, to Bell & Howell Company. Motor driven continuous form folder. 4,516,761, Cl. 270-41.000.

Richard, Bruno, to Centre National de la Recherche Scientifique. Ultrasonic echogram probe and sector echographic scanning device. 4,516,583, Cl. 128-660.000.

Richards, Ray S.: *See*—
Nelson, Frederick J.; and Richards, Ray S., 4,516,934, Cl. 432-30.000.

Richardson, Paul; Albers, Daniel C.; and Whitley, David A., to Santa Fe International Corporation. Blind shaft drilling. 4,516,633, Cl. 166-69.000.

Richert, Carson T.: *See*—
Crain, N. Robert; and Richert, Carson T., 4,517,448, Cl. 219-388.000.

Richmond, Michael S.: *See*—
Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., 4,517,642, Cl. 364-200.000.

Richter, Albert P., Jr.; and Peelman, Harold E., to Texaco Inc. Temperature stabilization system for a radiation detector in a well logging tool. 4,517,459, Cl. 250-261.000.

Richter, Johan C. F. C.: *See*—
Richter, Ole J.; and Richter, Johan C. F. C., 4,516,887, Cl. 406-63.000.

Richter, Ole J.; and Richter, Johan C. F. C., to Kamyr, Inc. Feeder deflection compensation. 4,516,887, Cl. 406-63.000.

Ricoh Company, Ltd.: *See*—
Iiyama, Kiyotaka; and Taniguchi, Keishi, 4,517,580, Cl. 346-214.000.
Ohkouchi, Fusakichi; and Suzuki, Kazuhiro, 4,517,607, Cl. 358-284.000.

Ridout, Paul S.; and Birks, Colin, to Lucas Chloride EV Systems Limited. Heat sink for semi-conductor devices having terminals projecting from a heat sink transfer face. 4,517,585, Cl. 357-81.000.

Riedl, Reinhold, to Haacon hebetechnik GmbH. Movable lifting and depositing device for portable containers, e.g., cabins, containers, shelters or the like. 4,516,901, Cl. 414-458.000.

Rigler, Josef K.: *See*—
Reese, Dirk; and Rigler, Josef K., 4,517,314, Cl. 521-59.000.

Rigo, Marcel L. A.: *See*—
Bouiller, Jean G.; Delonge, Jean-Claude L.; Rigo, Marcel L. A.; and Zietek, Didier G., 4,516,910, Cl. 416-190.000.

Rijckaert, Albert M. A.; and de Niet, Edmond, to U.S. Philips Corporation. Reproducing apparatus with controlled gain output independent of tracking errors. 4,517,612, Cl. 360-67.000.

Rikagaku Kenkyusho: *See*—
Isono, Kiyoshi; Nakamura, Goto; and Fujita, Shigeo, 4,517,178, Cl. 424-122.000.

Rimai, Donald S.: *See*—
Jadwin, Thomas A.; and Rimai, Donald S., 4,517,272, Cl. 430-110.000.

Ringleib, Colin J.: *See*—
Szerenyi, Peter; and Ringleib, Colin J., 4,517,135, Cl. 261-104.000.

Riss, Wilfried; Nitschko, Theodor; Spitaler, Engelbert; and Oberleitner, Gerhard, to TMC Corporation. Safety ski binding. 4,516,791, Cl. 280-612.000.

Ritt, Hans-Georg; Luneberg, Hartmut; Mannl, Reinhard; and Grillmeier, Alfred, to Schott-Ruhrglas GmbH. Method of making tubular vials and ampules. 4,516,998, Cl. 65-108.000.

Robbins, Kenneth W.: *See*—
Frew, John W.; and Robbins, Kenneth W., 4,516,861, Cl. 368-120.000.

Robert Bosch GmbH: *See*—
Buck, Rainer; Kuttner, Thomas; Piwonka, Fridolin; and Wessel, Wolf, 4,516,550, Cl. 123-357.000.
Dieffenbach, Rudiger; Grunwald, Werner; Perthus, Peter; and Prinzhausen, Friedrich, 4,517,630, Cl. 362-268.000.
Fricke, Hans-Jurgen, 4,516,475, Cl. 92-57.000.
Fussner, Paul; Hofmann, Karl; Komaroff, Iwan; Itoh, Katsuoki; Seifert, Kurt; Trachte, Dietrich; Vogel, Wilhelm; and Vogtmann, Hans-Jorg, 4,516,729, Cl. 239-453.000.
Fussner, Paul, 4,516,730, Cl. 239-533.800.
Heinrich, Wulf-Dieter; and Otte, Henning, 4,517,506, Cl. 318-807.000.
Pfluger, Gerhard, 4,517,482, Cl. 310-78.000.

Robert, Joseph, administrator: *See*—
Pierret, Luc A., deceased; Robert, Joseph, administrator; Pierret, Hubert; Pierret, Gabriel L.; Pierret, Maurice J.; and Pierret, Jean-Marie M., 4,516,734, Cl. 241-283.000.

Roberts, Ernest F. Propulsion unit for a water-borne vessel. 4,516,940, Cl. 440-53.000.

Roberts, Richard W., to Borg-Warner Corporation. Capacity control of rotary vane apparatus. 4,516,919, Cl. 418-23.000.

Robertson, Simon A.: *See*—
Thornton, Ian; DeWitt, Kenneth W.; and Robertson, Simon A., 4,517,209, Cl. 426-383.000.

Robinson, Frederick P. A.: *See*—
Kaljee, Jan; Lalor, Leo J.; Pagani, Sergio M.; and Robinson, Frederick P. A., 4,517,441, Cl. 219-146.230.

Robinson, Geoffrey C.: *See*—
Venable, Thomas L.; Robinson, Geoffrey C.; and Loeslein, Raymond D., 4,516,815, Cl. 339-14.00R.

Rocke, Richard D.: *See*—
Mulliner, Richard R.; and Rocke, Richard D., 4,517,571, Cl. 343-771.000.

Rockwell International Corporation: *See*—
Cascini, Michael R., 4,516,834, Cl. 350-335.000.
Moriarty, Michael P., 4,517,165, Cl. 423-244.000.
Sheill, David D., 4,516,666, Cl. 188-73.380.

Rodarte, Michael R. Aerodynamic throwing implement. 4,516,946, Cl. 446-46.000.

Rodemeyer, Gunther: *See*—
Rudolph, Gert; and Rodemeyer, Gunther, 4,516,588, Cl. 131-291.000.

Rody, Jean: *See*—
Leppard, David G.; and Rody, Jean, 4,517,283, Cl. 430-512.000.

Roe, Jonas L., to Terradyne Limited. Gimbal mounted on frame with heavy metal plate sides. 4,516,338, Cl. 37-4.000.

Roerig, Arnold J.; and Schroeder, Robert W., to Beloit Corporation. Slice lip adjustment. 4,517,056, Cl. 162-344.000.

Roffler, Werner: *See*—
Langenegger, Urs; Roffler, Werner; and Rutsche, Wendolin, 4,516,509, Cl. 108-147.000.

Roger, Guy-Roland: *See*—
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.

Rogers, Gerald: *See*—
Solimeno, Duane; Koeppen, Peter L.; Rogers, Gerald; and Brown, Sammy K., 4,517,656, Cl. 364-900.000.

Rogic, Milorad M.: *See*—
Anello, Louis G.; Van Der Puy, Michael; Hendrickson, Larry L.; Rogic, Milorad M.; Swerdloff, Michael D.; and Kolc, Jaroslav F., 4,517,002, Cl. 71-28.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,003, Cl. 71-28.000.
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Rohm GmbH: *See*—
Arndt, Peter J.; Muller, Manfred; Schlosser, Fritz; and Wenzel, Franz, 4,517,380, Cl. 564-206.000.
Muramatsu, Toshio; Totani, Nagao; and Mangold, Helmut K., 4,517,297, Cl. 435-128.000.

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Hann, William M.; DuPrè, Jean; and Natoli, John, 4,517,098, Cl. 210-701.000.
Zdanowski, Richard E.; and Owens, Joseph M., 4,517,330, Cl. 524-408.000.

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Mills, David; Kington, Alan D.; and Close, Rodney J., 4,516,621, Cl. 164-339.000.

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Roos, Eberhard, to Delma- elektro- und medizinische Apparatebau Gesellschaft mbH. Operating theatre lamp. 4,517,632, Cl. 362-389.000.

Rose, John W., to Motorola, Inc. Deposition and diffusion source control means and method. 4,517,220, Cl. 427-8.000.

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Rossi, Gianrico, to Edwards Alto Vuoto S.p.A. Device for controlling the position of product containers carrying plates of a lyophilization and the like apparatus. 4,516,333, Cl. 34-92.000.

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Lawson, John E.; Matier, William L.; and Roth, Herbert R., 4,517,188, Cl. 514-394.000.

Rowland, Nelson; and Getto, Robert D., to Burlington Industries, Inc. Modular pallet and shipping tray. 4,516,677, Cl. 206-394.000.

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Roychoudhury, Rathindra N., to Nestec, S.A. Coffee oil treatment. 4,517,120, Cl. 426-655.000.

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Ruhl, Rolf: *See*—
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Ruitberg, Arthur P.; and Young, Kenneth M., to United States of America, National Aeronautics and Space Administration. High voltage power supply. 4,517,472, Cl. 307-82.000.

Russell, Cornelius R., to Combustion Engineering, Inc. Nozzle cooled by heat pipe means. 4,516,631, Cl. 165-47.000.

Russell, John L., Jr.; and Noonan, Denise J., to Nuclear Medicine, Inc. Methods for neutron-capture tumor therapy. 4,516,535, Cl. 128-1.100.

Russell, Michael J. H.; and Murrer, Barry A., to Johnson Matthey Public Limited Company. Hydrogenation of olefins and aldehydes. 4,517,390, Cl. 568-881.000.

Ruth, Kenneth: *See*—
Berger, Charles; and Ruth, Kenneth, 4,517,267, Cl. 430-3.000.

Rutsche, Wendolin: *See*—
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Lewis, Edwin C.; Henschenmacher, Helmut; Ecker, Karl-Heinz; Giernalczyk, Hartmut; and Rutte, Siegfried, 4,516,477, Cl. 92-128.000.

Ryang, Hong-Son, to General Electric Company. Heat curable compositions. 4,517,342, Cl. 525-431.000.

Rye, Grover W.: *See*—
Palmer, Kenneth J.; Brandyberry, Dennis R.; and Rye, Grover W., 4,516,395, Cl. 57-237.000.

S&A Corporation: *See*—
Gulick, William D., 4,516,519, Cl. 114-270.000.

S.A.E.S. Getters S.p.A.: *See*—
Martelli, Daniele, 4,516,945, Cl. 445-19.000.

S.N.E.C.M.A.: *See*—
Bouiller, Jean G.; Delonge, Jean-Claude L.; Rigo, Marcel L. A.; and Zietek, Didier G., 4,516,910, Cl. 416-190.000.

Saab-Scania Aktiebolag: *See*—
Magnusson, Karl G.; and Stahl, Hans V., 4,517,646, Cl. 364-424.100.

Sachs, Klaus, to Anton Piller GmbH & Co. KG. Rotary converter machine for direct transfer of electric energy by flux linkage between windings on a stator pack. 4,517,471, Cl. 307-67.000.

Sadauskas, Raymond L.; and Moore, Paul E., to Arcair Company. Underwater electrode with waterproof integrity. 4,517,440, Cl. 219-145.100.

Sadoway, Donald R.: *See*—
Rose, Robert M.; and Sadoway, Donald R., 4,517,253, Cl. 428-620.000.

Safeway Products Inc.: *See*—
Torning, Ralph R., 4,517,446, Cl. 219-386.000.

Sagaser, Thomas M., to Clark Equipment Company. Pump centering control. 4,516,439, Cl. 74-470.000.

Sagem: *See—*
Veragen, Rene , 4,516,567, Cl. 128-1.00D.
Saichi, Egusa: *See—*
Tadashi, Ii; and Saichi, Egusa, 4,517,018, Cl. 75-129.000.
Saigo, Hiroshi; and Kaneko, Hiroshi, to Iwaya Corporation. Movable toy animal. 4,516,951, Cl. 446-338.000.
Saiko, Alfons: *See—*
Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alfons, 4,516,943, Cl. 441-35.000.
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Burget, Paul; and Zortea, Michel, 4,517,000, Cl. 65-178.000.
St. Joseph Bank and Trust Company, executor: *See—*
D'Alelio, Gaetano F., deceased, 4,517,354, Cl. 528-172.000.
D'Alelio, Gaetano F., deceased; and Waitkus, Phillip A., 4,517,364, Cl. 546-66.000.
St. Joseph Bank and Trust Company, legal representative: *See—*
D'Alelio, Gaetano F., deceased; and Waitkus, Phillip A., 4,517,363, Cl. 546-66.000.
Saito, Junya: *See—*
Yamada, Hisafumi; Saito, Junya; and Tsutsui, Ichiro, 4,517,601, Cl. 358-167.000.
Saito, Tadao; Kishi, Takao; and Kakuta, Yoshiyuki, to Yoshino Kogyosho Co., Ltd. Manually-operated sprayer. 4,516,727, Cl. 239-333.000.
Saitou, Tatuya: *See—*
Yamawaki, Takeshi; Saitou, Tatuya; and Sugimori, Sigemi, 4,516,804, Cl. 296-214.000.
Sakai, Koichi, to Toko, Inc. Variable impedance circuit. 4,517,508, Cl. 323-352.000.
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Nishikawa, Masao; Aoki, Takashi; Sakai, Shinzo; and Yoshizawa, Hiroshi, 4,516,671, Cl. 192-.076.
Sakai, Takami, to Tokyo Shibaura Denki Kabushiki Kaisha. Power conversion equipment. 4,517,634, Cl. 363-35.000.
Sakakibara, Hideo; Awata, Masashi; Satoi, Shuzo; Mutoh, Naoki; Takada, Masaki; and Hayashi, Mitsuo, to Toyo Jozo Kabushiki Kaisha. Antibiotic acmimycin and its production. 4,517,296, Cl. 435-119.000.
Sakakibara, Shuzi: *See—*
Inaba, Hideaki; and Sakakibara, Shuzi, 4,517,015, Cl. 75-12.000.
Sakata, Yoshio, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Megnetic device. 4,517,539, Cl. 335-302.000.
Saksena, Anil K.: *See—*
Kreutner, William; Green, Michael J.; Shue, Ho-Jane; and Saksena, Anil K., 4,517,200, Cl. 514-455.000.
Sakuno, Hideaki: *See—*
Kobayashi, Satoru; Masaki, Mikio; Sakuno, Hideaki; Shimizu, Keiichi; and Fukasawa, Takeshi, 4,516,415, Cl. 70-252.000.
Sakurada, Masahiko: *See—*
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Sakurai, Kiyomi, to Nippon Paint Co., Ltd. Photosensitive resin compositions useful as flexographic plates. 4,517,278, Cl. 430-286.000.
Salathiel, William M., to Exxon Production Research Co. Method of breaking an emulsion and an emulsion-emulsion breaker composition. 4,517,102, Cl. 252-8.55R.
Salk Institute for Biological Studies, The: *See—*
Ling, Nicholas C.; Esch, Frederick S.; Bohlen, Peter; Brazeau, Paul E., Jr.; and Guillemin, Roger C. L., 4,517,181, Cl. 514-12.000.
SAMIN Societe Azionaria Minero-Metallurgicia S.p.A.: *See—*
Guerriero, Renato, 4,517,065, Cl. 204-119.000.
Samson, Wilfred J., to Advanced Cardiovascular Systems, Inc. Guiding catheter and method of manufacture. 4,516,972, Cl. 604-282.000.
San Shoe Trading Corp.: *See—*
Adamik, Jaroslav, 4,516,337, Cl. 36-136.000.
Sanders, Gerhard. Arrangement for heating and/or heat retaining of containers. 4,516,935, Cl. 432-247.000.
Sanderson, Dilworth. Self locking holder for an item of jewelry. 4,516,294, Cl. 24-41.000.
Sanderson, John R.; Watts, Lewis W., Jr.; and Renken, Terry L., to Texaco Inc. Cycloalkane epoxides produced by air oxidation of cycloalkenes over oxide catalysts. 4,517,374, Cl. 549-533.000.
Sando Iron Works Co. Ltd.: *See—*
Sando, Yoshikazu; and Nakano, Eiichi, 4,516,283, Cl. 8-149.100.
Sando, Yoshikazu; and Nakano, Eiichi, to Sando Iron Works Co. Ltd. Method for continuous bleaching of cloth. 4,516,283, Cl. 8-149.100.
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Baumann, Hans-Peter, 4,516,979, Cl. 8-583.000.
Sane, Ajit Y.: *See—*
Harney, Marilyn J.; Vauss, Elvin M., Jr.; and Sane, Ajit Y., 4,517,069, Cl. 204-290.00F.
Sanimed Vertrieb AG: *See—*
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Sankyo Company, Limited: *See—*
Manome, Taichi; Ohmine, Toshinori; Okazaki, Takao; and Arai, Mamoru, 4,517,300, Cl. 435-317.000.
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Sansui Electric Co., Ltd.: *See—*
Tanaka, Susumu; and Ito, Ryosuke, 4,517,528, Cl. 330-297.000.
Santa Fe International Corporation: *See—*
Richardson, Paul; Albers, Daniel C.; and Whitley, David A., 4,516,633, Cl. 166-69.000.
Santen Pharmaceutical Co., Ltd.: *See—*
Iso, Tadashi; and Oya, Masayuki, 4,517,123, Cl. 260-239.30R.
Santrade Ltd.: *See—*
Karlsson, Harry L., 4,516,640, Cl. 175-227.000.
Sanyo Electric Co., Ltd.: *See—*
Aoki, Yoshiaki; Suzuki, Hazime; and Hirota, Tatsuya, 4,516,335, Cl. 34-133.000.
Horinouchi, Atsushi, 4,517,429, Cl. 219-10.55B.
Saron, John R., to Key Medical, Inc. Flexible light. 4,517,499, Cl. 315-362.000.
Saros, Stephen, to Technicon Instruments Corporation. Continuous flow metering apparatus. 4,517,302, Cl. 436-180.000.
Sasano, Kiyomi: *See—*
Yamauchi, Toshiaki; Hibi, Tsuneo; Sasano, Kiyomi; and Hayashi, Yoshiki, 4,516,331, Cl. 34-77.000.
Sater, Bernard L. Method of making a high intensity solar cell. 4,516,314, Cl. 29-572.000.
Sato, Hirotake: *See—*
Takasaki, Junsuke; Sato, Hirotake; and Yasuda, Akira, 4,517,031, Cl. 148-12.00C.
Sato, Koji: *See—*
Terauchi, Takashi; Sato, Koji; and Hoshi, Shoichi, 4,517,397, Cl. 585-428.000.
Sato, Tetsuya: *See—*
Nagase, Hyosuke; Sato, Tetsuya; Kobayashi, Kazuo; Masumoto, Norio; and Nagase, Yuji, 4,517,087, Cl. 210-396.000.
Sato, Yoshiaki: *See—*
Suzuki, Hirosuke; and Sato, Yoshiaki, 4,517,247, Cl. 428-421.000.
Sato, Yoshito; Yato, Tokuhiro; Maeo, Hidemi; and Tsutsumi, Yoshio, to Kabushiki Kaisha Komatsu Seisakusho. Electric hydraulic controll device for a construction vehicle. 4,516,469, Cl. 91-362.000.
Satoh, Fusao, to Nippon Gakki Seizo Kabushiki Kaisha. Key mechanism for wind instruments. 4,516,463, Cl. 84-385.00R.
Satoi, Shuzo: *See—*
Sakakibara, Hideo; Awata, Masashi; Satoi, Shuzo; Mutoh, Naoki; Takada, Masaki; and Hayashi, Mitsuo, 4,517,296, Cl. 435-119.000.
Satzinger, Gerhard: *See—*
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Satzler, Ronald L., to Caterpillar Tractor Co. Method and apparatus for making braided reinforced hose. 4,517,039, Cl. 156-149.000.
Saul, Ben; and Hartley, Doug, to Sur-Gard Security Systems Ltd. Automatic bypass switch for household security system. 4,517,556, Cl. 340-528.000.
Sawada, Daisaku: *See—*
Ina, Toshikazu; Kawai, Hisasi; Kohama, Tokio; Obayashi, Hideki; Sawada, Daisaku; and Shigematsu, Takashi, 4,517,648, Cl. 364-431.010.
Sawazaki, Masauki: *See—*
Masumoto, Kazuhiro; Fujimura, Mituaki; and Sawazaki, Masauki, 4,517,151, Cl. 264-540.000.
Say, Donald L., to North American Philips Consumer Electronics Corp. In-line electron gun structure for color cathode ray tube having lensing electrodes with tapered apertures and beam spot-shaping inserts. 4,517,488, Cl. 313-414.000.
Scarton, Henry A.; DiBianca, John A.; Lacey, James A.; and Kennedy, Warren C., to Rensselaer Polytechnic Institute. Coulome friction noise and vibration damping. 4,516,658, Cl. 181-208.000.
Schacht, Roy A. Printing wheel connecting and adjusting means. 4,516,867, Cl. 400-175.000.
Schaeffer, Andrew P., to Cincinnati Milacron Inc. Knife assembly for tape laying machine. 4,516,461, Cl. 83-881.000.
Schalkowsky, Samuel; and Pepper, William, Jr., to Spiral System Instruments, Inc. Method and apparatus for testing microbial interaction with growth affecting substances. 4,517,292, Cl. 435-32.000.
Scharpenberg, Rainer: *See—*
Pieper, Kurt; and Scharpenberg, Rainer, 4,517,152, Cl. 376-252.000.
Scheck, Georg; and Bogner, Martin, to GEZE GmbH. Laterally releasable toe unit for a ski safety binding. 4,516,792, Cl. 280-625.000.
Scheibe, Peter; Bernt, Erich; and Klose, Sigmar, to Boehringer Mannheim GmbH. Method and reagent for the enzymatic determination of enzyme substrates. 4,517,287, Cl. 435-4.000.
Scheinecker, Alois, to Voest-Alpine Aktiengesellschaft. Continuous casting plant. 4,516,623, Cl. 164-416.000.
Schemenauer, Harold. Apparatus for imprinting and cutting a tape or ribbon. 4,516,493, Cl. 101-27.000.
Scher, Herbert I.: *See—*
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Schering Aktiengesellschaft: *See—*
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Grapentin, Joachim; Mahlkow, Hartmut; and Skupsch, Jurgen, 4,517,254, Cl. 428-626.000.
Skotsch, Carlo; Baumert, Dietrich; Krahmer, Hansjorg; and Arndt, Friedrich, 4,517,367, Cl. 546-276.000.
Schering-Plough Corporation: *See—*
Kreutner, William; Green, Michael J.; Shue, Ho-Jane; and Saksena, Anil K., 4,517,200, Cl. 514-455.000.
Schlecker, Rainer; Friedrich, Ludwig; and Lenke, Dieter, to BASF Aktiengesellschaft. Tricyclic thiazolyloxamic acids and their derivatives, their preparation, and therapeutic agents containing these compounds. 4,517,196, Cl. 514-371.000.

Schlegel, Barbara W., Administratrix: *See*—
Przybysz, John X.; and Schlegel, Earl S., deceased, 4,516,315, Cl. 29-576.00B.

Schlegel Corporation: *See*—
Weichman, Edward C., 4,517,233, Cl. 428-108.000.

Schlegel, Earl S., deceased: *See*—
Przybysz, John X.; and Schlegel, Earl S., deceased, 4,516,315, Cl. 29-576.00B.

Schleimer, Stephen I.: *See*—
Ahlstrom, John K.; Bernstein, David H.; Clancy, Gerald F.; Gruner, Ronald H.; Mundie, Craig J.; Richmond, Michael S.; Schleimer, Stephen I.; Wallach, Steven J.; and Wallach, Walter A., Jr., 4,517,642, Cl. 364-200.000.

Schlein, Allen P. Shearing apparatus. 4,516,322, Cl. 30-92.000.

Schlein, Allen P. Perforated closed cell padding material. 4,516,572, Cl. 128-156.000.

Schlosser, Fritz: *See*—
Arndt, Peter J.; Muller, Manfred; Schlosser, Fritz; and Wenzel, Franz, 4,517,380, Cl. 564-206.000.

Schmidt, Manfred; Rathmann, Dietrich; and Reinking, Klaus, to Bayer Aktiengesellschaft. Mixtures of substituted diphenyl ethers with aromatic polyesters and polyester carbonates having an improved processibility. 4,517,328, Cl. 524-370.000.

Schmidt, Robert R.: *See*—
Thomss, Rudolf; Draber, Wilfried; Schmidt, Robert R.; and Eue, Ludwig, 4,517,011, Cl. 71-92.000.

Schmidt, Robert W., to Copar Corporation. Dripless valve. 4,516,702, Cl. 222-514.000.

Schmidt, Werner, to Dynamit Nobel AG. Stable aqueous impregnating solutions prepared from hydrolyzed alkyltrialkoxysilanes. 4,517,375, Cl. 556-463.000.

Schmitt, Kirk D., to Mobil Oil Corporation. Two-tailed surfactants having one aromatic containing tail and their use in chemical waterflooding. 4,517,128, Cl. 260-458.00C.

Schmitz, Gunter: *See*—
Langlitz, Karlheinz; and Schmitz, Gunter, 4,516,757, Cl. 266-245.000.

Schneider, Franz; and Ruhl, Rolf, to L. Schuler GmbH. Numerically controlled groove-stamping machine. 4,516,447, Cl. 83-71.000.

Schoeber, Willem J. A. H.: *See*—
Mink, Bernardus H.; and Schoeber, Willem J. A. H., 4,516,989, Cl. 55-68.000.

Schollmeier, Charles E., to A. E. Staley Manufacturing Company. Semi-crystalline fructose. 4,517,021, Cl. 127-30.000.

Scholz, Bernhard: *See*—
Obenaus, Fritz; Nierlich, Franz; Reitemeyer, Otto; and Scholz, Bernhard, 4,517,395, Cl. 585-259.000.

Schon, Christian O. Method and apparatus for impregnating porous electrodes or the like. 4,517,137, Cl. 264-29.500.

Schonwald, Siegfried: *See*—
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Schott-Ruhrglas GmbH: *See*—
Ritt, Hans-Georg; Luneberg, Hartmut; Mannl, Reinhard; and Grillmeier, Alfred, 4,516,998, Cl. 65-108.000.

Schreck, Ronald P.: *See*—
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.

Schreiber, Loren B.: *See*—
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.

Schreiber, William L.: *See*—
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.

Schroeder Brothers Corporation: *See*—
Keeney, Keith; and Wehner, Dennis J., 4,516,467, Cl. 91-31.000.

Schroeder, Robert W.: *See*—
Roerig, Arnold J.; and Schroeder, Robert W., 4,517,056, Cl. 162-344.000.

Schroeder, Warren C. Garment suspension waistband. 4,516,275, Cl. 2-308.000.

Schuchard, Walter F.: *See*—
Marsocci, Angelo A.; and Schuchard, Walter F., 4,517,555, Cl. 340-522.000.

Schultz, Per-Erik; Chowdhury, Mofazzal H.; and Neff, Clayton B., to Alfa-Laval, Inc. Milker unit washer. 4,516,592, Cl. 134-169.00C.

Schultz, Steven M.: *See*—
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Schulz, Gunther: *See*—
Lynch, John; Naarmann, Herbert; Schulz, Gunther; Vyvial, Rudolf; Wallbillich, Gunter; and Zurger, Manfred, 4,517,277, Cl. 430-281.000.

Schulze, Arne. Tremolo and electronic control device for stringed instruments. 4,516,462, Cl. 84-1.160.

Schupp, Eberhard; and Kempter, Fritz E., to BASF Aktiengesellschaft. Cathodically electrodepositable surface coating binder. 4,517,343, Cl. 525-488.000.

Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, to BASF Aktiengesellschaft. Continuous preparation of ethanol. 4,517,391, Cl. 568-885.000.

Schuurink, Pieter H. J.: *See*—
Kik, Leendert A.; and Schuurink, Pieter H. J., 4,517,248, Cl. 428-457.000.

Schwartz, Albert B.: *See*—
Chester, Arthur W.; Garwood, William E.; and Schwartz, Albert B., 4,517,399, Cl. 585-533.000.

Schwartz, Joel, to U.S. Balloon Mfg. Co., Inc. Self sealing valve assembly. 4,516,949, Cl. 446-222.000.

Schwefel, Ernst, to Dr. Johannes Heidenhain GmbH. Integrated bit processor/word processor control system. 4,517,657, Cl. 364-900.000.

Scientific Circuitry, Inc.: *See*—
Shepter, Joseph J., 4,517,474, Cl. 307-272.00R.

Scott & Fetzer Company, The: *See*—
Edwards, James D.; and Malone, Charles, 4,517,426, Cl. 200-38.00A.

Scott, Junius D.: *See*—
Gotal, John D.; and Scott, Junius D., 4,517,500, Cl. 318-130.000.

Scott, Michael J.; Slater, Paul; and Brooshooft, Lawrence H., to Allflex International Limited. Applicator tool. 4,516,577, Cl. 128-330.000.

Seago, James L., to Du Pont de Nemours, E. I., and Company. Biological detection process using polymer-coated electrodes. 4,517,291, Cl. 435-14.000.

Seal, Clinton D.: *See*—
Keller, Patrick N.; and Seal, Clinton D., 4,517,593, Cl. 358-107.000.

Seely, James R., to Marketing Displays, Inc. Portable wind-resistant sign stand with flexible sign. 4,516,344, Cl. 40-602.000.

Seeman, Jindrich: *See*—
Valasek, Miloslav; Langer, Frantisek; Hradek, Jaroslav; and Seeman, Jindrich, 4,517,457, Cl. 250-239.000.

Seifert, Kurt: *See*—
Fussner, Paul; Hofmann, Karl; Komaroff, Iwan; Itoh, Katsuoki; Seifert, Kurt; Trachte, Dietrich; Vogel, Wilhelm; and Vogtmann, Hans-Jorg, 4,516,729, Cl. 239-453.000.

Seiki Engineering & Research Co. Ltd.: *See*—
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Seiko Instruments & Electronics Ltd.: *See*—
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Seitz, Hans; Frerichs, Udo; Rach, Heinz-Dieter; and Spendel, Siegmund, to Continental Gummi-Werke Aktiengesellschaft. Method of mounting a tire. 4,516,617, Cl. 157-1.000.

Sekerich, Michael, to Grant Hardware Company. Cabinet door mounting mechanism. 4,516,813, Cl. 312-323.000.

Sekiguchi, Kazuya: *See*—
Sugisawa, Ko; Sekiguchi, Kazuya; Taguchi, Masao; Nakatani, Masayuki; and Iwata, Hitoshi, 4,516,596, Cl. 137-240.000.

Sekine, Kunio; Masuda, Hitoshi; Ishibashi, Kodo; Hirai, Masahide; Tomoshige, Shozo; and Kondo, Kozo, to Dowa Mining Co., Ltd.; and Unitika, Ltd. Method of selective separation and concentration of gallium and/or indium from solutions containing low levels of them and high levels of other metal ions. 4,517,096, Cl. 210-668.000.

Sekisu Kagaku Kogyo Kabushiki Kaisha: *See*—
Miyoshi, Hiroshi; Mori, Hirohumi; and Tanoue, Yoriko, 4,517,318, Cl. 523-126.000.

Sell, Gunther: *See*—
Leistner, Gerhard; Muller, Gerhard; Sell, Gunther; and Bauer, Alexander, 4,517,093, Cl. 210-629.000.

Senghaas, Karl A.; and Senghaas, Peter, to Southwest Bailer Pump Company. Solid state control system for oil well bailer pump. 4,516,911, Cl. 417-2.000.

Senghaas, Peter: *See*—
Senghaas, Karl A.; and Senghaas, Peter, 4,516,911, Cl. 417-2.000.

Seshimoto, Osamu, to Fuji Photo Film Co., Ltd. Ionic activity measuring device. 4,517,071, Cl. 204-419.000.

Sessions, Robert W., to Ferris Manufacturing Corp. EKG electrode. 4,516,581, Cl. 128-639.000.

SGS-ATES Componenti Elettronici S.p.A.: *See*—
Baldi, Livio; and Maggis, Aldo, 4,517,226, Cl. 427-90.000.

Shahaney, Sunil: *See*—
Woodward, Antony I.; Clarke, David G.; and Shahaney, Sunil, 4,517,285, Cl. 430-538.000.

Sharp Kabushiki Kaisha: *See*—
Ise, Masahiro; Machino, Katsuyuki; Tanaka, Hidehiko; and Matsubara, Toshiyuki, 4,517,548, Cl. 340-310.00R.
Yasui, Toru; and Nakatsuji, Haruo, 4,517,494, Cl. 315-85.000.

Sheill, David D., to Rockwell International Corporation. Disc brake anti-rattle means. 4,516,666, Cl. 188-73.380.

Shell Oil Company: *See*—
Anderson, Martin, 4,517,193, Cl. 514-471.000.
Ayers, Ray R., 4,516,517, Cl. 114-51.000.
Hoek, Arend; and Kieffer, Eduard P., 4,517,396, Cl. 585-415.000.
Jepsen, John C., 4,516,986, Cl. 55-18.000.
Klecka, Miro E., 4,517,170, Cl. 423-573.00R.
Mink, Bernardus H.; and Schoeber, Willem J. A. H., 4,516,989, Cl. 55-68.000.

Shepter, Joseph J., to Scientific Circuitry, Inc. Logic circuit building block and systems constructed from same. 4,517,474, Cl. 307-272.00R.

Sherburne Corporation: *See*—
Avery, Joseph J., 4,516,722, Cl. 239-14.000.

Sheriff, Merle M., to Hydraulic Technology Corporation. Double acting telescopic cylinder construction. 4,516,468, Cl. 91-169.000.

Sherman, Clarence A., to ZSI, Inc. Tubing clamp and method of making the same. 4,516,296, Cl. 24-279.000.

Sherman, John D.: *See*—
Chao, Chien C.; and Sherman, John D., 4,516,566, Cl. 127-46.300.

Sherman, Morton: *See—*
Berry, James A.; Sherman, Morton; and Stevenson, John W., 4,516,879, Cl. 405-132.000.
Sherwin, Martin B.: *See—*
Wang, Shu-Chieh P.; and Sherwin, Martin B., 4,517,392, Cl. 568-948.000.
Wang, Shu-Chieh P.; and Sherwin, Martin B., 4,517,394, Cl. 568-948.000.
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Sherwood, William G.: *See—*
Hodges, Donald R.; and Sherwood, William G., 4,517,058, Cl. 204-4.000.
Shibaike, Narito; Minamide, Seiko; Kikuya, Satoshi; Terada, Hiroshi; and Zaitsu, Osamu, to Matsushita Electric Industrial Co., Ltd. Magnetic recording and playback apparatus. 4,517,613, Cl. 360-85.000.
Shibata, Takehiko: *See—*
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.
Shibuya, Tsunenori, to Diesel Kiki Co., Ltd. Variable capacity vane compressor capable of controlling back pressure acting upon vanes. 4,516,920, Cl. 418-23.000.
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Ina, Toshikazu; Kawai, Hisasi; Kohama, Tokio; Obayashi, Hideki; Sawada, Daisaku; and Shigematsu, Takashi, 4,517,648, Cl. 364-431.010.
Shim, Jaewon L., to Merck & Co., Inc. Gellan gum/gelatin blends. 4,517,216, Cl. 426-573.000.
Shimadu Corporation: *See—*
Nakamura, Kenji; and Ideno, Shigeru, 4,517,550, Cl. 340-347.0CC.
Shimauchi, Yasutaka: *See—*
Yoshioka, Takeo; Yamamoto, Kenichi; Fukagawa, Yasuo; Shimauchi, Yasutaka; and Ishikura, Tomoyuki, 4,517,127, Cl. 260-245.20T.
Shimizu, Isamu; and Arao, Kozo, to Canon Kabushiki Kaisha. Photoconductive member. 4,517,269, Cl. 430-57.000.
Shimizu, Katsuichi: *See—*
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.
Shimizu, Keiichi: *See—*
Kobayashi, Satoru; Masaki, Mikio; Sakuno, Hideaki; Shimizu, Keiichi; and Fukasawa, Takeshi, 4,516,415, Cl. 70-252.000.
Shimizu, Shigeo; and Kato, Toshio, to Victor Company of Japan, Ltd. Recording media comprising vertical magnetization layers essentially consisting of quaternary Co—Ni—Zn—P alloys. 4,517,257, Cl. 428-694.000.
Shinagawa, Akio: *See—*
Hattori, Akira; Hayashi, Hiromu; Shinagawa, Akio; and Shinogi, Tsuyoshi, 4,517,640, Cl. 364-200.000.
Shinogi, Tsuyoshi: *See—*
Hattori, Akira; Hayashi, Hiromu; Shinagawa, Akio; and Shinogi, Tsuyoshi, 4,517,640, Cl. 364-200.000.
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Neki, Shigeo; Shinozaki, Nozomu; and Morofuji, Takeshi, 4,516,514, Cl. 112-275.000.
Shioya, Toshio; and Kimura, Katsuhiko, to Honda Giken Kogyo Kabushiki Kaisha. Fuel feeding system for an internal combustion engine. 4,516,555, Cl. 123-470.000.
Shioyama, Giichi: *See—*
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.
Shiraishi, Mitsuru: *See—*
Numata, Mitsuo; Minamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,517,361, Cl. 544-24.000.
Shirogane, Yoshiji: *See—*
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.
Shirota, Norihisa; and Abe, Takao, to Sony Corporation. Method and apparatus for N-to-M encoding. 4,517,552, Cl. 340-347.0DD.
Shlichta, Paul J., to United States of America, National Aeronautics and Space Administration. Method for minimizing convection during crystal growth from solution. 4,517,048, Cl. 156-621.000.
Shoaf, Myron D.; and Pischke, La Monte D., to General Foods Corporation. Sweetening composition and method. 4,517,214, Cl. 426-548.000.
Shokestu Kinzoku Kogyo Kabushiki Kaisha: *See—*
Oneyama, Naotake; and Yoshikawa, Akihisa, 4,516,473, Cl. 91-462.000.
Showa Denko K.K.: *See—*
Ishikawa, Masayuki; Azuma, Hiroshi; Sugimoto, Akiko; Takahashi, Noriko; and Takashima, Yoshimi, 4,517,189, Cl. 514-259.000.
Shue, Ho-Jane: *See—*
Kreutner, William; Green, Michael J.; Shue, Ho-Jane; and Saksena, Anil K., 4,517,200, Cl. 514-455.000.
Shuffield, Luther. Rectal device and method of inserting same. 4,516,578, Cl. 128-341.000.
Shuttleworth, Edwin T., to Wilson Tool Company. Slug-retaining die. 4,516,450, Cl. 83-146.000.
Sieczkowski, Philip: *See—*
McDonald, Quentin H.; Montalbano, Anthony P.; and Sieczkowski, Philip, 4,516,806, Cl. 297-457.000.
Siegling, Hans-Friedrich: *See—*
Meistring, Rolf; Siegling, Hans-Friedrich; and Pfahl, Siegfried, 4,516,831, Cl. 350-96.230.
Siemens Aktiengesellschaft: *See—*
Barre, Claude, 4,517,476, Cl. 307-455.000.
Horbaschek, Heinz, 4,517,594, Cl. 358-111.000.
Kardinal, Hans-Joachim, 4,516,888, Cl. 406-182.000.
Leitgeb, Wilhelm; and Schonwald, Siegfried, 4,516,912, Cl. 417-45.000.
Moser, Otto W.; and Thilo, Peer, 4,517,554, Cl. 340-514.000.
Pfleiderer, Hans-Joerg; and Grassl, Gerhard, 4,517,672, Cl. 371-27.000.
Weiser, Josef; Heinzl, Alfred; and Stadler, Heinz, 4,517,537, Cl. 335-187.000.
Wessely, Herrmann, 4,517,624, Cl. 361-387.000.
Siemens-Allis, Inc.: *See—*
Barner, Gregory P.; and Hancock, Drew S., 4,517,623, Cl. 361-358.000.
Signetics Corporation: *See—*
Broadbent, Eliot K., 4,517,225, Cl. 427-89.000.
Siiberg, Hemming G., to Edison International Inc. Voltage and temperature compensated time delay relay. 4,517,542, Cl. 337-92.000.
Silberberg, Joseph: *See—*
Aliberto, Anthony C.; and Silberberg, Joseph, 4,517,339, Cl. 525-85.000.
Simmons, Lovel R. Ejector wagon. 4,516,904, Cl. 414-517.000.
Simonson, John L.: *See—*
Marinak, Michael J.; and Simonson, John L., 4,517,369, Cl. 546-345.000.
Simpkins, Terry J.: *See—*
Leeper, Marvin A.; Turner, Richard L.; and Simpkins, Terry J., 4,516,805, Cl. 297-330.000.
Simplex-GE Limited: *See—*
Ireland, Hugh C., 4,516,814, Cl. 339-7.000.
Simpson, Carolyn N.; and Perry, John A. Tamper-proof wrap. 4,516,679, Cl. 206-459.000.
Simpson, Harold G., to Encon Products, Inc. Insulation and paneling apparatus and method. 4,516,371, Cl. 52-269.000.
Singer Company, The: *See—*
Sumerau, William R., 4,516,289, Cl. 15-410.000.
Singer, Karl, to D&K Custom Machine Design, Inc. Method and apparatus for decurling laminated stock. 4,517,042, Cl. 156-164.000.
Singh, Baldev: *See—*
Lesher, George Y.; and Singh, Baldev, 4,517,190, Cl. 514-300.000.
Sinha, Kamal R.; and Caldwell, Brian E., to Wheaton Industries. Protective coating for dry heat sterilizable glassware. 4,517,242, Cl. 428-336.000.
Sinha, Kamal R.; and Caldwell, Brian E., to Wheaton Industries. Glass coating composition and method. 4,517,243, Cl. 428-336.000.
Sipra, Patententwicklungs-und Beteiligungsgegesellschaft gmbH: *See—*
Nurk, Siegfried, 4,516,738, Cl. 242-152.100.
Sittig, Roland, to BBC Brown, Boveri & Company, Limited. Asymmetrical thyristor with highly doped anode base layer region for optimized blocking and forward voltages. 4,517,582, Cl. 357-38.000.
Sizer, Theodore, II: *See—*
Mourou, Gerard; and Sizer, Theodore, II, 4,517,675, Cl. 372-53.000.
SKF Kugellagerfabriken GmbH: *See—*
Brandenstein, Manfred; Haas, Roland; Edelmann, Ludwig; and Hans, Rudiger, 4,516,962, Cl. 474-112.000.
Skotsch, Carlo; Baumert, Dietrich; Krahmer, Hansjorg; and Arndt, Friedrich, to Schering Aktiengesellschaft. Azolyl-pentene derivatives and biocidal compositions containing the same. 4,517,367, Cl. 546-276.000.
Skupsch, Jurgen: *See—*
Grapentin, Joachim; Mahlkow, Hartmut; and Skupsch, Jurgen, 4,517,254, Cl. 428-626.000.
Slater, Paul: *See—*
Scott, Michael J.; Slater, Paul; and Brooshooft, Lawrence H., 4,516,577, Cl. 128-330.000.
Slife, Fred W., to FBC Limited. Herbicidal mixtures. 4,517,009, Cl. 71-90.000.
Slottag, Mark J., to GCA Corporation. Microwave heating device with constant temperature control of the magnetron. 4,517,430, Cl. 219-10.55B.
Smeets, Frans H. M., to U.S. Philips Corporation. Inductive device. 4,517,509, Cl. 323-362.000.
Smith, Clarence, Jr.: *See—*
Beard, Frederick H.; Moyer, Maynard M.; and Smith, Clarence, Jr., 4,516,307, Cl. 29-564.000.
Smith, Donald L.: *See—*
Miller, Lee E.; Carr, Dennis D.; and Smith, Donald L., 4,517,264, Cl. 429-163.000.
Smith, George R. Conditioned air vestibule for refrigerated warehouse doorway. 4,516,482, Cl. 98-36.000.
Smith and Nephew Associated Companies p.l.c.: *See—*
Buchan, Ian A., 4,516,571, Cl. 128-132.00R.
Smith, Robert A.: *See—*
White, Mary A.; Beers, Melvin D.; Lucas, Gary M.; Smith, Robert A.; and Swiger, Roger T., 4,517,352, Cl. 528-18.000.
Smith, Stephen F., to Alpha-Omega Engineering, Inc. Circuit detector and noise reduction network with circuit detector. 4,517,534, Cl. 333-14.000.

Smith, Wesley H.: *See—*
Betts, William; and Smith, Wesley H., 4,517,680, Cl. 375-75.000.
Smith, William N., III. Human body activated switch. 4,517,423, Cl. 200-52.00R.
Smithgall, Brian: *See—*
Zwirn, Robert; Dragavon, Edward J.; and Smithgall, Brian, 4,517,599, Cl. 358-166.000.
Smolyanitsky, Boris N.: *See—*
Kostylev, Alexandr D.; Syryamin, Jury N.; Smolyanitsky, Boris N.; Boginsky, Vladimir P.; and Terskov, Alexei D., 4,516,662, Cl. 173-53.000.
Snetsinger, David C.; Engster, Henry M.; and Stiebler, Dwaine D., to Ralston Purina Company. Feed intake control apparatus for animals. 4,516,531, Cl. 119-18.000.
Snider, Wendall L.; and Wagner, Edward A., to Berkeley Glasslab. Cantilever paddle for use with wafer boats. 4,516,897, Cl. 414-180.000.
Snyder Corporation: *See—*
Beard, Frederick H.; Moyer, Maynard M.; and Smith, Clarence, Jr., 4,516,307, Cl. 29-564.000.
Snyder, William B., Jr.: *See—*
Prakash, Sri; and Snyder, William B., Jr., 4,517,155, Cl. 419-19.000.
Snygg, Keijo K., to Lenox Machine Company, Inc. Method and apparatus for winding webs. 4,516,735, Cl. 242-56.00R.
S.A. Automobiles Citroen: *See—*
Largeteau, Pierre A., 4,516,359, Cl. 51-349.000.
Societe Anonyme D.B.A.: *See—*
Carre, Jean-Jacques, 4,516,810, Cl. 303-24.00F.
Societe Anonyme dite: L'Oreal: *See—*
Jacquet, Bernard; Lang, Gerard; Malaval, Alain; Forestier, Serge; and Le Trung, Do, 4,517,174, Cl. 424-62.000.
Societe Automobiles Peugeot: *See—*
Largeteau, Pierre A., 4,516,359, Cl. 51-349.000.
Societe Chimique des Charbonnages S.A.: *See—*
Bujadoux, Karel, 4,517,346, Cl. 526-153.000.
Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestres et Amphibies S.E.D.A.M.: *See—*
Duchateau, Claude M., 4,516,651, Cl. 180-127.000.
Societe d'Exploitation des Procedes Marechal: *See—*
Le Magourou, Yves, 4,516,819, Cl. 339-46.000.
Societe Nationale Industrielle Aerospatiale: *See—*
Chaussepied, Jacques E. C., 4,516,686, Cl. 220-85.00R.
Sofec, Inc.: *See—*
Pedersen, Kristen I., 4,516,942, Cl. 441-5.000.
Sofranko, John A., to Atlantic Richfield Company. Hydroxylated magnesia support. 4,517,398, Cl. 585-500.000.
Soled, Howard: *See—*
Gringer, Donald; and Soled, Howard, 4,516,360, Cl. 51-384.000.
Solimeno, Duane; Koeppen, Peter L.; Rogers, Gerald; and Brown, Sammy K., to Texas Instruments Incorporated. Programmable game with virtual CPU's sharing ALU and memory for simultaneous execution of independent game inputs. 4,517,656, Cl. 364-900.000.
Solis S.r.l.: *See—*
Gazzarrini, Vinicio, 4,516,513, Cl. 112-262.200.
Sone, Masazumi; Imai, Iwao; and Nagae, Hiromitsu, to Nissan Motor Co., Ltd.; and Hitachi, Ltd. Method of making radio frequency interference suppressing ignition distributor rotor. 4,516,319, Cl. 29-877.000.
Sonoda, Sakae; Nagae, Yoshio; and Kano, Seishi, to Parker Chemical Company. Process for the cold forming of iron and steel. 4,517,029, Cl. 148-6.15Z.
Sony Coporation: *See—*
Tsuji, Akira; Ito, Sadayuki; and Fujimoto, Kazumi, 4,517,617, Cl. 360-133.000.
Sony Corporation: *See—*
Shirota, Norihisa; and Abe, Takao, 4,517,552, Cl. 340-347.0DD.
Yamada, Hisafumi; Saito, Junya; and Tsutsui, Ichiro, 4,517,601, Cl. 358-167.000.
Sorbier, Jean-Pierre: *See—*
Jerome, Denis; More, Claude; Roger, Guy-Roland; Sorbier, Jean-Pierre; Delrieu, Jean-Marc; Ribault, Michel; Fabre, Jean M.; Fournel, Andre ; Giral, Louis; and Bechgaard, Klaus, 4,517,121, Cl. 260-239.00R.
Soref, Richard A.; and McMahon, Donald H., to Sperry Corporation. Electro-optical switch for unpolarized optical signals. 4,516,837, Cl. 350-347.00V.
Sorensen, Edward C., Jr. Means for controlling row planters. 4,516,670, Cl. 192-48.800.
Sour Pliva farmaceutska, kemijska prehrambena i kozmeticka industrija, n.sol.o.: *See—*
Kobrehel, Gabrijela; and Djokic, Slobodan, 4,517,359, Cl. 536-7.400.
Southard, George L., to Vipont Laboratories, Inc. Plaque disclosing agent. 4,517,172, Cl. 424-7.100.
Southwest Bailer Pump Company: *See—*
Senghaas, Karl A.; and Senghaas, Peter, 4,516,911, Cl. 417-2.000.
Sovonics Solar Systems: *See—*
Ovshinsky, Stanford R.; Allred, David D.; Walter, Lee; and Hudgens, Stephen J., 4,517,223, Cl. 427-39.000.
Spain, Raymond G., to Hitco. Non-ionic epoxy resin emulsion finishes for carbon fibers. 4,517,245, Cl. 428-367.000.
Spaunhorst, Vernon R., to McGraw-Edison Company. Time delay electric fuse. 4,517,544, Cl. 337-164.000.
Speakman, John G.: *See—*
Eve, Paul L.; and Speakman, John G., 4,517,345, Cl. 526-105.000.
Spears, Richard L.: *See—*
Nordbrock, Raymond E.; and Spears, Richard L., 4,517,507, Cl. 322-28.000.
Spectrum Control, Inc.: *See—*
Venable, Thomas L.; Robinson, Geoffrey C.; and Loeslein, Raymond D., 4,516,815, Cl. 339-14.00R.
Spellar, Peter C.: *See—*
Murphy, David A.; and Spellar, Peter C., 4,516,914, Cl. 417-282.000.
Spencer, Dudley W. C. Sterile docking process, apparatus and system. 4,516,971, Cl. 604-280.000.
Spencer, Phillip B.: *See—*
Drutchas, Gilbert H.; and Spencer, Phillip B., 4,516,918, Cl. 418-15.000.
Spendel, Siegmund: *See—*
Seitz, Hans; Frerichs, Udo; Rach, Heinz-Dieter; and Spendel, Siegmund, 4,516,617, Cl. 157-1.000.
Spengler, Adolf; and Hasenhundl, Josef, to Eirich, Hubert, Eirich; Paul and Eirich; Walter. Apparatus for closing a discharge opening in a rotary table. 4,516,859, Cl. 366-77.000.
Sperry Corporation: *See—*
Frew, John W.; and Robbins, Kenneth W., 4,516,861, Cl. 368-120.000.
Lee, Patrick G.; Bean, Donald E.; and Jones, Randy T., 4,517,567, Cl. 343-17.700.
McLean, Kenneth W., 4,516,391, Cl. 56-16.400.
McLean, Kenneth W.; and Hale, John K., 4,516,392, Cl. 56-16.400.
Soref, Richard A.; and McMahon, Donald H., 4,516,837, Cl. 350-347.00V.
Spieldiener, Reinhold: *See—*
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Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alfons. Amusement ride raft. 4,516,943, Cl. 441-35.000.
Spiral System Instruments, Inc.: *See—*
Schalkowsky, Samuel; and Pepper, William, Jr., 4,517,292, Cl. 435-32.000.
Spitaler, Engelbert: *See—*
Riss, Wilfried; Nitschko, Theodor; Spitaler, Engelbert; and Oberleitner, Gerhard, 4,516,791, Cl. 280-612.000.
Sprague Electric Company: *See—*
Allen, Michael D.; and Van Voorhis, John E., 4,517,626, Cl. 361-433.000.
Harland, Gary D.; and Brownell, Dean B., 4,517,144, Cl. 264-28.000.
Sprague, Robert A., to Xerox Corporation. Direct read after write optical disk system. 4,517,667, Cl. 369-122.000.
Sprecker, Mark A., to International Flavors & Fragrances Inc. Flavoring with norbornyl esters. 4,517,213, Cl. 426-538.000.
Springen, Clyde H.: *See—*
Bennett, Ross L.; Price, Robert B.; Springen, Clyde H.; and Kilbourn, Harlan C., 4,517,652, Cl. 364-513.000.
Staab, Donald C.; and Farley, Clayton E., to MU, Inc. Pavement grinding apparatus. 4,516,808, Cl. 299-39.000.
Stackhouse, Kenneth B.: *See—*
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.
Stadler, Heinz: *See—*
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Stafford, Lawrence R. Safety device for scaffold. 4,516,661, Cl. 182-82.000.
Stahl, Hans V.: *See—*
Magnusson, Karl G.; and Stahl, Hans V., 4,517,646, Cl. 364-424.100.
Stahl, Werner; and Muller, Jurgen, to Agfa-Gevaert Aktiengesellschaft. Method and apparatus for singularizing stacked X-ray films or the like. 4,516,763, Cl. 271-11.000.
Stahl, Werner. Decanter-type separating apparatus. 4,517,092, Cl. 210-512.100.
Stahlecker, Fritz; and Raasch, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. Open end yarn spinning apparatus. 4,516,396, Cl. 57-407.000.
Stahlecker, Hans: *See—*
Stahlecker, Fritz; and Raasch, Hans, 4,516,396, Cl. 57-407.000.
Stahlhofen, Paul, to Hoechst Aktiengesellschaft. Light-sensitive mixture based on O-naphthoquinone-diazides, and light-sensitive copying material prepared therefrom. 4,517,275, Cl. 430-165.000.
Stahn, Roland: *See—*
Fabricius, Hans-Åke; and Stahn, Roland, 4,517,293, Cl. 435-68.000.
Staiert, Richard W., to Caterpillar Tractor Co. Weld joint structure for an elastomeric flexible coupling. 4,516,956, Cl. 464-89.000.
Standard Oil Company: *See—*
Beynet, Pierre A.; and von Aschwege, J. Thomas, 4,516,881, Cl. 405-195.000.
Cirjak, Larry M., 4,517,063, Cl. 204-157.10R.
Standridge, Bobby D.: *See—*
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Stanhope, Harry W.: *See—*
Bell, Gilbert C.; and Stanhope, Harry W., 4,516,394, Cl. 57-234.000.
Stauffer Chemical Company: *See—*
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 4,517,012, Cl. 71-94.000.

Stawski, Karl-Heinz; and Jensen, Philip W., to P D Manufacturing, Inc. Portable battery powered blower apparatus for fanning charcoal or other fuel. 4,516,561, Cl. 126-25.00B.

Steckler, Steven A.: *See—*
Balaban, Alvin R.; and Steckler, Steven A., 4,517,586, Cl. 358-13.000.

Steel Handlers' Manual and Steel Handloaders' Components, Inc.: *See—*
Vizecky, Donald F., 4,516,460, Cl. 83-861.000.

Steele, Robert E., to General Motors Corporation. Duplex communication on a single optical fiber. 4,516,828, Cl. 350-96.160.

Stein, Richard M.: *See—*
Hill, Ronald C.; Stein, Richard M.; Bzibziak, Raymond J.; and Goodwill, Robert, 4,516,448, Cl. 83-137.000.

Steinbiss, Eberhard; and Herchenbach, Horst, to Klockner-Humboldt-Deutz AG. Apparatus for rapid burning of thermally pretreated fine grained product and method. 4,517,020, Cl. 106-100.000.

Steiner, Wolfgang: *See—*
Schuster, Ludwig; Mueller, Franz-Josef; Anderlohr, Axel; Blei, Peter; Eigenberger, Gerhart; Hoppner, Bernd; Kaibel, Gerd; and Steiner, Wolfgang, 4,517,391, Cl. 568-885.000.

Stelzenmuller, William K.: *See—*
Lasher, Dana A.; and Stelzenmuller, William K., 4,517,604, Cl. 358-262.000.

Stenger, Vernon A.: *See—*
Dorman, Linneaus C.; and Stenger, Vernon A., 4,517,111, Cl. 252-186.250.

Stephan, Hans-Werner: *See—*
Jodden, Klaus; Heymer, Gero; and Stephan, Hans-Werner, 4,517,163, Cl. 423-75.000.

Sterling Drug Inc.: *See—*
Lesher, George Y.; and Singh, Baldev, 4,517,190, Cl. 514-300.000.
Lesher, George Y., 4,517,192, Cl. 514-345.000.
Wentland, Mark P.; and Bailey, Denis M., 4,517,191, Cl. 514-300.000.

Stern, Alan D.: *See—*
Ferrell, Philip J.; Stern, Alan D.; and McFarland, Melvin D., 4,517,639, Cl. 364-186.000.

Stern, Richard A.; and Babbitt, Richard W., to United States of America, Army. Low loss dielectric waveguide joint and method of forming same. 4,517,536, Cl. 333-254.000.

Stetter, Klaus: *See—*
Kiefer, Werner; and Stetter, Klaus, 4,516,999, Cl. 65-116.000.

Stevenson, John W.: *See—*
Berry, James A.; Sherman, Morton; and Stevenson, John W., 4,516,879, Cl. 405-132.000.

Stewart Stamping Corporation: *See—*
Brennan, Robert J.; and Meighen, Terrence, 4,516,825, Cl. 339-143.00R.

Stiebler, Dwaine D.: *See—*
Snetsinger, David C.; Engster, Henry M.; and Stiebler, Dwaine D., 4,516,531, Cl. 119-18.000.

Stienstra, Albert J.: *See—*
Claasen, Theodoor A. C. M.; Stienstra, Albert J.; and van Roermund, Arthur H. M., 4,517,655, Cl. 364-703.000.

Stilling, Johann. Sign structure. 4,516,343, Cl. 40-574.000.

Stocco, Sam; and Davis, Stanley, to Thiele Engineering Company. Rotary pick and placement machine. 4,516,765, Cl. 271-95.000.

Stoetzer, Steven R., to Acheson Industries, Inc. New nickel coating composition for shielding electronic equipment and the like. 4,517,118, Cl. 252-513.000.

Stohr, Frank-Michael: *See—*
Kunde, Klaus; and Stohr, Frank-Michael, 4,517,357, Cl. 534-605.000.

Stokes, Larry W.: *See—*
Yerushalmy, Yosef; and Stokes, Larry W., 4,517,437, Cl. 219-121.0PP.

Stolpp, Siegfried, to ALB Klein GmbH & Co. KG. Load pressure feedback system having at least one control valve for controlling an apparatus. 4,516,894, Cl. 414-5.000.

Stone, Milton. Sun sensing control device. 4,516,565, Cl. 126-419.000.

Stonkus, Donald J.: *See—*
Filter, Reinhard; and Stonkus, Donald J., 4,516,823, Cl. 339-111.000.

Stork, Karl: *See—*
Oppenlaender, Knut; Stork, Karl; and Barthold, Klaus, 4,517,114, Cl. 252-389.00R.

Stork PMT B.V.: *See—*
van Mil, Martinus P. G., 4,516,290, Cl. 17-11.000.

Stott, Edward J.; Thomas, Lewis H.; and Jebbett, Norma J., to National Research Development Corporation. Production of viral antigens. 4,517,304, Cl. 436-518.000.

Stower, James F.: *See—*
Goldberger, Robert D.; and Stower, James F., 4,516,291, Cl. 17-32.000.

Stratton, William P. Baseball batting trainer. 4,516,772, Cl. 273-26.00R.

Straub, Albert M.; Mabrey, Theodore R.; and Vokovich, Daniel L., to Northern Telecom Limited. Mechanism for extracting tape from a tape carrier. 4,517,614, Cl. 360-85.000.

Straub, Richard L.: *See—*
Pou, Frederick M.; and Straub, Richard L., 4,516,497, Cl. 101-240.000.

Straznickas, Donald A.: *See—*
Hucker, David J.; and Straznickas, Donald A., 4,517,483, Cl. 310-156.000.

Strobel, Gary A.; Gavlak, Andrea H.; and Jaynes, Jesse M., to Research and Development Institute, Inc. at Montana State University. Compositions containing and methods of use of an infectivity-cured Hr plasmid-bearing microorganism. 4,517,008, Cl. 71-77.000.

Stumpf, Gunter O. Apparatus for laying web material. 4,516,760, Cl. 270-31.000.

Stupak, Adam E. Well safety valve. 4,516,598, Cl. 137-318.000.

Sturman, Oded E.; Grill, Benjamin; and Harrison, Lynn. Pressure regulating valves. 4,516,600, Cl. 137-495.000.

Suarez, Benjamin D. Baseball game. 4,516,775, Cl. 273-89.000.

Suda, Tatsuo: *See—*
Takayama, Hiroaki; Yamada, Sachiko; Nakayama, Keiko; and Suda, Tatsuo, 4,517,125, Cl. 260-397.200.

Sugawara, Fukuo, to Alps Electric Co., Ltd. Multi-color pen recording device. 4,517,576, Cl. 346-139.00R.

Sugimori, Fumio; Nishino, Chikae; and Harao, Norio, to Tokyo Shibaura Denki Kabushiki Kaisha. Vacuum container of radiation image multiplier tube and method of manufacturing the same. 4,516,715, Cl. 228-208.000.

Sugimori, Sigemi: *See—*
Yamawaki, Takeshi; Saitou, Tatuya; and Sugimori, Sigemi, 4,516,804, Cl. 296-214.000.

Sugimoto, Akiko: *See—*
Ishikawa, Masayuki; Azuma, Hiroshi; Sugimoto, Akiko; Takahashi, Noriko; and Takashima, Yoshimi, 4,517,189, Cl. 514-259.000.

Sugimoto, Hitoshi: *See—*
Abe, Yoshiaki; Nishimura, Yutaka; and Sugimoto, Hitoshi, 4,516,543, Cl. 123-179.00H.

Sugimoto, Norihiko: *See—*
Hamada, Nobuhiro; Sugimoto, Norihiko; and Nawa, Masumi, 4,517,644, Cl. 364-200.000.

Sugioka, Shinji, to Ushio Denki Kabushiki Kaisha. Photochemical vapor deposition apparatus. 4,516,527, Cl. 118-723.000.

Sugisawa, Ko; Sekiguchi, Kazuya; Taguchi, Masao; Nakatani, Masayuki; and Iwata, Hitoshi, to House Food Industrial Company, Ltd. System for cleaning a three-way valve. 4,516,596, Cl. 137-240.000.

Sugitani, Yuji; and Kobayashi, Yukio, to Nippon Kokan Kabushiki Kaisha. Rotary arc-welding apparatus. 4,517,438, Cl. 219-125.120.

Sugiura, Nobuo: *See—*
Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, 4,517,180, Cl. 514-16.000.

Sullivan, William B. Mechanical stabilizer. 4,516,749, Cl. 248-56.000.

Sulzer Brothers Limited: *See—*
Brunner, Alfred, 4,516,750, Cl. 248-58.000.

Sumerau, William R., to Singer Company, The. Handle construction for floor care appliance. 4,516,289, Cl. 15-410.000.

Sumida, Atsushi; Ozaki, Keiichiro; and Watanabe, Shizuo, to Toray Industries, Inc. Method of producing carbon fibers. 4,517,169, Cl. 423-447.400.

Sumitomo Chemical Company, Limited: *See—*
Matsuyama, Kiyoshi; Ochi, Kenji; Ogawa, Hiroyuki; Suzaki, Takuya; and Imai, Kazuyoshi, 4,517,246, Cl. 428-407.000.

Sumitomo Electric Industries, Ltd.: *See—*
Okamoto, Kenji; Nishiwaki, Yoshikazu; Matsuoka, Shunji; and Nishiura, Yozo, 4,517,280, Cl. 430-321.000.

Sundstrand Corporation: *See—*
Aleem, Mohd A.; and Krinickas, Alexander, Jr., 4,517,479, Cl. 310-54.000.
Hucker, David J.; and Straznickas, Donald A., 4,517,483, Cl. 310-156.000.
Niggemann, Richard E., 4,516,987, Cl. 55-52.000.

Suntory Limited: *See—*
Taguchi, Haruyoshi; Tsujimura, Hideo; and Imanishi, Masamichi, 4,516,687, Cl. 220-94.00R.

Super-Truss Building Systems, Inc.: *See—*
Beaulieu, Roger D.; Alcorn, William W.; and Matychowiak, David S., 4,516,363, Cl. 52-90.000.

Sur-Gard Security Systems Ltd.: *See—*
Saul, Ben; and Hartley, Doug, 4,517,556, Cl. 340-528.000.

Susumu Ubukata: *See—*
Ubukata, Susumu; Mizutani, Yasukazu; and Iyoda, Shozo, 4,517,541, Cl. 337-89.000.

Suto, Anthony J., to Fairchild Camera And Instrument Corporation. Current probe signal processing circuit employing sample and hold technique to locate circuit faults. 4,517,511, Cl. 324-52.000.

Sutton, Wesley D., Jr., to Game Time, Inc. Resilient support for playground seat. 4,516,766, Cl. 272-52.000.

Suzaki, Takuya: *See—*
Matsuyama, Kiyoshi; Ochi, Kenji; Ogawa, Hiroyuki; Suzaki, Takuya; and Imai, Kazuyoshi, 4,517,246, Cl. 428-407.000.

Suzuki, Akira: *See—*
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.

Suzuki, Etsuji: *See—*
Kashihara, Tomio; Tsuruta, Toshiro; Yamaguchi, Masayoshi; Yokoi, Kiyotachi; and Suzuki, Etsuji, 4,516,673, Cl. 198-341.000.

Suzuki, Hazime: *See—*
Aoki, Yoshiaki; Suzuki, Hazime; and Hirota, Tatsuya, 4,516,335, Cl. 34-133.000.

Suzuki, Hiroshi; Gama, Yasuo; and Miyazaki, Shoji, to Agency of Industrial Science and Technology. Rust preventive agent of hydroxypolybasic acid salt type. 4,517,110, Cl. 252-180.000.

Suzuki, Hiroshige; and Hase, Teizo, to Suzuki, Hiroshige. Finely divided silicon carbide having a high content of 2H-type silicon carbide and method of producing the same. 4,517,305, Cl. 501-89.000.

Suzuki, Hirosuke; and Sato, Yoshiaki, to Junkosha Co., Ltd. Fluororesin formed body and method for producing the same. 4,517,247, Cl. 428-421.000.
Suzuki, Kazuhiro: *See*—
Ohkouchi, Fusakichi; and Suzuki, Kazuhiro, 4,517,607, Cl. 358-284.000.
Suzuki, Norio, to Nippon Electric Co., Ltd. System comprising a preliminary processing device controlled in accordance with an amount of information stored in a buffer. 4,517,596, Cl. 358-133.000.
Suzuki, Ryoichi; Matsumoto, Seiichi; Amikura, Takashi; Tsunekawa, Tokuichi; and Uchiyama, Takashi, to Canon Kabushiki Kaisha. Liquid crystal display system. 4,516,835, Cl. 350-336.000.
Suzuki, Toshio: *See*—
Mine, Katsutoshi; Suzuki, Toshio; and Hanada, Tsuneo, 4,517,238, Cl. 428-212.000.
Suzuki, Yoshikuni: *See*—
Koyama, Hiroyasu; Tsuji, Masahiro; and Suzuki, Yoshikuni, 4,517,365, Cl. 546-142.000.
Svecia Silkscreen Maskiner AB: *See*—
Ericsson, Sylve J. D., 4,516,495, Cl. 101-129.000.
Sweeney, Donald W.; Gallagher, Neal C.; and Christensen, Charles R., to United States of America, Army. Scanning beam beamrider missile guidance system. 4,516,743, Cl. 244-3.130.
Swenson, Hilmer W.: *See*—
Heath, James E.; and Swenson, Hilmer W., 4,517,464, Cl. 250-370.000.
Swerdloff, Michael D.; Kolc, Jaroslav F.; Rogic, Milorad M.; and Hendrickson, Larry L., to Allied Corporation. Aryl phosphoric triamide and aryl phosphorodiamidate urease and nitrification inhibitors and urease and nitrification inhibited urea and reduced nitrogen based fertilizer compositions. 4,517,004, Cl. 71-28.000.
Swerdloff, Michael D.; Kolc, Jaroslav F.; Rogic, Milorad M.; and Hendrickson, Larry L., to Allied Corporation. Phosphoroamide urease inhibitors and urease inhibited urea based fertilizer compositions. 4,517,007, Cl. 71-28.000.
Swerdloff, Michael D.: *See*—
Anello, Louis G.; Van Der Puy, Michael; Hendrickson, Larry L.; Rogic, Milorad M.; Swerdloff, Michael D.; and Kolc, Jaroslav F., 4,517,002, Cl. 71-28.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,003, Cl. 71-28.000.
Kolc, Jaroslav F.; Swerdloff, Michael D.; Rogic, Milorad M.; and Hendrickson, Larry L., 4,517,005, Cl. 71-28.000.
Swift, Gregory W.; Migliori, Albert; and Wheatley, John C., to United States of America, Energy. Microchannel crossflow fluid heat exchanger and method for its fabrication. 4,516,632, Cl. 165-167.000.
Swiger, Roger T.: *See*—
White, Mary A.; Beers, Melvin D.; Lucas, Gary M.; Smith, Robert A.; and Swiger, Roger T., 4,517,352, Cl. 528-18.000.
Sydnor, Richard L., to United States of America, National Aeronautics and Space Administration. Maser cavity servo-tuning system. 4,517,530, Cl. 331-3.000.
Syryamin, Jury N.: *See*—
Kostylev, Alexandr D.; Syryamin, Jury N.; Smolyanitsky, Boris N.; Boginsky, Vladimir P.; and Terskov, Alexei D., 4,516,662, Cl. 173-53.000.
Szablikowski, Klaus: *See*—
Luhmann, Erhard; Hoppe, Lutz; Szablikowski, Klaus; and Lampert, Friedrich-Karl, 4,517,324, Cl. 524-27.000.
Szelagowski, Peter; and Motzkau, Siegfried, to Kernforschungszentrum Karlsruhe G.m.b.H. Apparatus for the coating of workpieces by flame spraying. 4,516,521, Cl. 118-50.000.
Szerenyi, Peter; and Ringleib, Colin J., to PepsiCo, Inc. Carbonation measuring system and process. 4,517,135, Cl. 261-104.000.
Szymanski, Chester D.; and Neigel, Dennis, to National Starch and Chemical Corporation. Process for reacting quaternary ammonium monomer in the presence of anionic polymers. 4,517,351, Cl. 527-312.000.
T.R.E.G.I.E.: *See*—
Bronoel, Guy, 4,517,258, Cl. 429-21.000.
Taban, Charles H. Pessary. 4,516,570, Cl. 128-130.000.
Tabet, Michael J. Adjustable golf ball tee. 4,516,780, Cl. 273-202.000.
Taco Products, Incorporated: *See*—
Finn, Arnold H., 4,516,615, Cl. 81-20.000.
Tada, Satomi: *See*—
Kumasaka, Sadao; Tada, Satomi; Horikoshi, Shigeo; Kamanaka, Tamaki; and Taniguchi, Hiroshi, 4,517,312, Cl. 521-47.000.
Tada, Seiichi, to Du Pont-Mitsui Polychemicals Co., Ltd. Polymer composition. 4,517,317, Cl. 521-95.000.
Tadashi, Ii; and Saichi, Egusa, to Kabushikigaisha Kyowa Chuzosho; Yugengaisha Kyowa Chuzosho; Otsuka Chemical Co., Ltd.; and Ando Parachemie Co., Ltd. Cast iron alloy and method for producing same. 4,517,018, Cl. 75-129.000.
Tagami, Katsutoshi: *See*—
Nakamura, Yukinobu; Tagami, Katsutoshi; and Takahashi, Tsuneo, 4,517,565, Cl. 340-995.000.
Taguchi, Haruyoshi; Tsujimura, Hideo; and Imanishi, Masamichi, to Suntory Limited. Handle for a vessel. 4,516,687, Cl. 220-94.00R.
Taguchi, Masao: *See*—
Sugisawa, Ko; Sekiguchi, Kazuya; Taguchi, Masao; Nakatani, Masayuki; and Iwata, Hitoshi, 4,516,596, Cl. 137-240.000.
Tahara, Hiroshi: *See*—
Kakuhashi, Takeshi; Tahara, Hiroshi; and Mori, Yoshihisa, 4,517,546, Cl. 338-320.000.
Takada, Masaki: *See*—
Sakakibara, Hideo; Awata, Masashi; Satoi, Shuzo; Mutoh, Naoki; Takada, Masaki; and Hayashi, Mitsuo, 4,517,296, Cl. 435-119.000.
Takahashi, Hideki: *See*—
Mitsue, Naoki; and Takahashi, Hideki, 4,516,783, Cl. 277-50.000.
Takahashi, Hideo; and Nakatani, Mitsuo, to Hitachi, Ltd. Dispersion type electroluminescent element with liquid dielectric and jelling agent. 4,517,490, Cl. 313-502.000.
Takahashi, Kohki; Kondoh, Takeo; Koga, Masao; and Nishiwaki, Kenichiro, to Denki Kagaku Kogyo Kabushiki Kaisha. Rubbery polymer composition. 4,517,348, Cl. 526-273.000.
Takahashi, Noriko: *See*—
Ishikawa, Masayuki; Azuma, Hiroshi; Sugimoto, Akiko; Takahashi, Noriko; and Takashima, Yoshimi, 4,517,189, Cl. 514-259.000.
Takahashi, Takao: *See*—
Onishi, Kimimasa; Takahashi, Takao; and Koriyama, Masayuki, 4,516,610, Cl. 139-435.000.
Takahashi, Tastuo: *See*—
Takakuwa, Shilo; Kobayashi, Isao; Takahashi, Tastuo; and Imamizu, Shige, 4,516,311, Cl. 29-568.000.
Takahashi, Tsuneo: *See*—
Nakamura, Yukinobu; Tagami, Katsutoshi; and Takahashi, Tsuneo, 4,517,565, Cl. 340-995.000.
Takakuwa, Shilo; Kobayashi, Isao; Takahashi, Tastuo; and Imamizu, Shige, to Kabushiki Kaisha Miyano Tekkosho. Machining centers. 4,516,311, Cl. 29-568.000.
Takamori, Kazuo: *See*—
Morishita, Tatsuo; Funakoshi, Fumio; Nakamura, Kenichi; and Takamori, Kazuo, 4,517,564, Cl. 340-825.690.
Takaoka, Shozo; and Hirasako, Akio, to Wakayama Iron Works, Ltd. Apparatus for clarifying and circulating hot air for heat-treating textile fabrics. 4,516,332, Cl. 34-79.000.
Takaoka, Takashi; Mochizuki, Masahiko; Yamashita, Mitsuo; and Miura, Tadao, to Tokyo Shibaura Denki Kabushiki Kaisha. Optical disk with narrow guide tracks. 4,517,668, Cl. 369-111.000.
Takara Co., Ltd.: *See*—
Obara, Hiroyuki, 4,516,948, Cl. 446-95.000.
Takasaki, Junsuke; Sato, Hirotake; and Yasuda, Akira, to Kawasaki Steel Corporation. Method of manufacturing cold rolled steel sheets for extra deep drawing with an excellent press formability. 4,517,031, Cl. 148-12.00C.
Takashima, Yoshimi: *See*—
Ishikawa, Masayuki; Azuma, Hiroshi; Sugimoto, Akiko; Takahashi, Noriko; and Takashima, Yoshimi, 4,517,189, Cl. 514-259.000.
Takasu, Ryo; and Nakao, Makoto, to Bridgestone Tire Co., Ltd. Method for controlling tire vulcanization. 4,517,146, Cl. 264-40.600.
Takayama, Hiroaki; Yamada, Sachiko; Nakayama, Keiko; and Suda, Tatsuo, to Chugai Seiyaku Kabushiki Kaisha. Novel vitamin $D_3$ derivatives and process for producing the same. 4,517,125, Cl. 260-397.200.
Takeda Chemical Industries, Ltd.: *See*—
Iwasa, Susumu; Yoshida, Isamu; and Kondo, Koichi, 4,517,290, Cl. 435-7.000.
Numata, Mitsuo; Minamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,517,361, Cl. 544-24.000.
Takematsu, Tetsuo; Nakaya, Mitihiko; Moriyasu, Koichi; and Komoto, Nobuo, to Mitsui Toatsu Chemicals, Inc. 2-Methyl-4'-isopropyl-2-pentenoyl anilide. 4,517,381, Cl. 564-207.000.
Takeshita, Masaru; Tokunaga, Toshio; and Ogawa, Yuichiro, to Bridgestone Tire Company Limited. Apparatus for cutting an elongate rubbery strip. 4,516,451, Cl. 83-171.000.
Takeuchi, Toshio: *See*—
Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, 4,517,282, Cl. 430-399.000.
Takeuchi, Yukihisa; and Tomita, Masahiro, to Nippondenso Co., Ltd.; and Nippon Soken, Inc. Carbon particulates cleaning device. 4,516,993, Cl. 55-283.000.
Takezawa, Susumu; Ikebe, Ken'ichi; Ayada, Haruki; Fukui, Tatsuyuki; and Okada, Munenori, to NEC Corporation. Nutation damper system comprising a control member for varying a natural frequency of a pendulum. 4,516,746, Cl. 244-170.000.
Takimoto, Hiroyuki, to Canon Kabushiki Kaisha. Rotation control system. 4,517,501, Cl. 318-314.000.
Takita, Masaaki: *See*—
Kakimoto, Atsushi; and Takita, Masaaki, 4,517,575, Cl. 346-138.000.
Tamburrino, Richard A., to North American Philips Consumer Electronics Corp. Cathode ray tube internal shielding means. 4,517,487, Cl. 313-407.000.
Tamura, Takashi, to Konishiroku Photo Industry Co., Ltd. Paper feeding device. 4,516,764, Cl. 271-34.000.
Tan, Ewe-Hong: *See*—
Wolff, Siegfried; and Tan, Ewe-Hong, 4,517,336, Cl. 524-571.000.
Tan, Yoichi; and Miyao, Fumio, to Fuji Xerox Co., Ltd. Carrier wave reproducing circuit in synchronized detection system of medium speed facsimile. 4,517,531, Cl. 331-14.000.
Tanaka, Hidehiko: *See*—
Ise, Masahiro; Machino, Katsuyuki; Tanaka, Hidehiko; and Matsubara, Toshiyuki, 4,517,548, Cl. 340-310.00R.
Tanaka, Minoru: *See*—
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Tanaka, Nobuyoshi: *See*—
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Tanaka, Shigeo: *See*—
Kagawa, Nobuaki; Fujimori, Noboru; Tanaka, Shigeo; and Onodera, Kaoru, 4,517,284, Cl. 430-591.000.
Tanaka, Susumu; and Ito, Ryosuke, to Sansui Electric Co., Ltd. Amplifier circuit driven by ground isolated power supply. 4,517,528, Cl. 330-297.000.
Tanaka, Yoshiharu, to Mitsui Engineering & Shipbuilding Co., Ltd. Waste heat recovery system for an internal combustion engine. 4,516,403, Cl. 60-667.000.
Tang, David Y., to Occidental Chemical Corporation. Process for the preparation of 4-fluorophthalic anhydride. 4,517,372, Cl. 549-246.000.
Tanga, Michifumi: *See*—
Hata, Akio; and Tanga, Michifumi, 4,517,350, Cl. 526-344.200.
Tanigawa, Kou; Masuda, Jiro; Nakamura, Kazumasa; and Hayashi, Kazuhiko, to Fujitsu Ten Limited; and Toyota Jidosha Kabushiki Kaisha. Apparatus for controlling the speed of an automobile. 4,516,652, Cl. 180-177.000.
Taniguchi, Hiroshi: *See*—
Kumasaka, Sadao; Tada, Satomi; Horikoshi, Shigeo; Kamanaka, Tamaki; and Taniguchi, Hiroshi, 4,517,312, Cl. 521-47.000.
Taniguchi, Hirotoshi. Method for continuously treating molten metal. 4,517,019, Cl. 75-130.00R.
Taniguchi, Keishi: *See*—
Iiyama, Kiyotaka; and Taniguchi, Keishi, 4,517,580, Cl. 346-214.000.
Tanoue, Yoriko: *See*—
Miyoshi, Hiroshi; Mori, Hirohumi; and Tanoue, Yoriko, 4,517,318, Cl. 523-126.000.
Taplin, John F. Pilot operated supply and waste control valve. 4,516,604, Cl. 137-596.150.
Taplin, John F. Four-way control valve. 4,516,605, Cl. 137-596.150.
Tarkett AB: *See*—
Grimhall, Carl G.; and Hoel, Olav, 4,516,614, Cl. 144-364.000.
Tarplee, Michael K., to Lucas Industries public limited company. Master cylinder assembly for a vehicle braking system. 4,516,400, Cl. 60-535.000.
Tatemoto, Minoru: *See*—
Kumagai, Naotake; Tatemoto, Minoru; Itoh: Yoji; and Inuzuka, Tokushige, 4,516,545, Cl. 123-192.00R.
Tatsumi, Hisao; and Kawano, Takashi, to Tokyo Shibaura Denki Kabushiki Kaisha. Vacuum insulated heat pot with removable electrically heated reservoir tank. 4,517,445, Cl. 219-297.000.
Tavin, Gerard, to Hutchinson. Devices for manufacturing annular frames for seals and to the corresponding frames and seals. 4,516,421, Cl. 72-354.000.
Taylor, Michael N.; and Reid, Timothy H., to Weyerhaeuser Company. Pressing process for composite wood panels. 4,517,147, Cl. 264-83.000.
Tazaki, Shigemitsu, to Canon Kabushiki Kaisha. Electronic apparatus with printer. 4,517,578, Cl. 346-140.00R.
TDK Corporation: *See*—
Moriya, Shigeru, 4,516,848, Cl. 355-3.0CH.
TDK Electronics Co., Ltd.: *See*—
Adachi, Hiromi; and Iwaya, Shoichi, 4,517,496, Cl. 315-227.00R.
Technicon Instruments Corporation: *See*—
Saros, Stephen, 4,517,302, Cl. 436-180.000.
Techniques Girodin: *See*—
Girodin, Marius G., 4,516,913, Cl. 417-243.000.
Tedder, Daniel W., to Georgia Tech Research Corporation. Process for producing fuel grade ethanol by continuous fermentation, solvent extraction and alcohol separation. 4,517,298, Cl. 435-160.000.
Teijin Limited: *See*—
Matsumura, Shunichi; and Inata, Hiroo, 4,517,315, Cl. 521-64.000.
Tektronix, Inc.: *See*—
Miles, Frank, 4,517,523, Cl. 330-126.000.
Telang, Anil, to Becton, Dickinson and Company. One-piece disposable collection bag having a rigid cover for a suction canister unit. 4,516,973, Cl. 604-319.000.
Teledyne Exploration Company: *See*—
Berglund, Carl O., 4,517,664, Cl. 367-163.000.
Teng, Daniel M., to Philip Morris Incorporated. Air-cured bright tobacco filler, blends and smoking articles. 4,516,590, Cl. 131-352.000.
Terada, Hiroshi: *See*—
Shibaike, Narito; Minamide, Seiko; Kikuya, Satoshi; Terada, Hiroshi; and Zaitsu, Osamu, 4,517,613, Cl. 360-85.000.
Terahara, Akira; and Tanaka, Minoru, to Sankyo Company, Limited. IsoMB-530B derivatives. 4,517,373, Cl. 549-292.000.
Teramoto, Kazuyoshi: *See*—
Tsuchihashi, Akira; and Teramoto, Kazuyoshi, 4,517,653, Cl. 364-513.000.
Terauchi, Takashi; Sato, Koji; and Hoshi, Shoichi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Oxidative dimerization of toluene. 4,517,397, Cl. 585-428.000.
Terason GmbH: *See*—
Reich, Karl, 4,517,133, Cl. 260-545.00R.
Terradyne Limited: *See*—
Roe, Jonas L., 4,516,338, Cl. 37-4.000.
Terskov, Alexei D.: *See*—
Kostylev, Alexandr D.; Syryamin, Jury N.; Smolyanitsky, Boris N.; Bogitsky, Vladimir P.; and Terskov, Alexei D., 4,516,662, Cl. 173-53.000.
Texaco Inc.: *See*—
Maddox, Jim, Jr., 4,516,635, Cl. 166-266.000.
Richter, Albert P., Jr.; and Perlman, Harold E., 4,517,459, Cl. 250-261.000.
Sanderson, John R.; Watts, Lewis W., Jr.; and Renken, Terry L., 4,517,374, Cl. 549-533.000.
Texas Instruments Incorporated: *See*—
Benitez, Willie B., III; and Masten, Billy R., 4,517,455, Cl. 235-463.000.
Bennett, Ross L.; Price, Robert B.; Springen, Clyde H.; and Kilbourn, Harlan C., 4,517,652, Cl. 364-513.000.
Solimeno, Duane; Koeppen, Peter L.; Rogers, Gerald; and Brown, Sammy K., 4,517,656, Cl. 364-900.000.
Thacker, Kipling: *See*—
Bracke, James W.; and Thacker, Kipling, 4,517,295, Cl. 435-101.000.
Theissen, Robert J., to Rhone-Poulenc Inc. 2-Nitro-5(substituted-phenoxy) benzoyl derivatives as herbicides. 4,517,010, Cl. 71-90.000.
Thermal Concepts, Inc.: *See*—
Bingham, Grady A., 4,516,629, Cl. 165-45.000.
Thiel, Max: *See*—
Bosies, Elmar; Kampe, Wolfgang; Thiel, Max; Bicker, Uwe; and Boerner, Dietmar, 4,517,183, Cl. 514-183.000.
Thiele Engineering Company: *See*—
Stocco, Sam; and Davis, Stanley, 4,516,765, Cl. 271-95.000.
Thilo, Peer: *See*—
Moser, Otto W.; and Thilo, Peer, 4,517,554, Cl. 340-514.000.
Thom-Mcl, Inc.: *See*—
Thompson, Thomas L., 4,517,239, Cl. 428-307.300.
Thomas, Evan G.: *See*—
Hopkins, Ronald J.; Thomas, Evan G.; and Kieta, Harold J., 4,517,106, Cl. 252-79.400.
Thomas, Lewis H.: *See*—
Stott, Edward J.; Thomas, Lewis H.; and Jebbett, Norma J., 4,517,304, Cl. 436-518.000.
Thomas, Rudolf; Draber, Wilfried; Schmidt, Robert R.; and Eue, Ludwig, to Bayer Aktiengesellschaft. N-substituted halogenoacetanilides and their use as herbicides. 4,517,011, Cl. 71-92.000.
Thompson, George H. B., to ITT Industries, Inc. Photodetector. 4,517,581, Cl. 357-30.000.
Thompson, Thomas L., to Thom-McI, Inc. Fiber-cement/plywood walking surface. 4,517,239, Cl. 428-307.300.
Thomsen, Jack W. Faucet device with replaceable valve cartridge. 4,516,753, Cl. 251-346.000.
Thomson-CSF: *See*—
Cornet, Jean, 4,517,574, Cl. 346-135.100.
Epsztein, Bernard; and Guyot, Lucien, 4,517,603, Cl. 358-213.000.
Thone, Heinrich; Hargassner, Reinhard; Deibl, Gottfried; and Holleis, Gunter, to Voest-Alpine Aktiengesellschaft. Piste mould of a continuous casting plant. 4,516,622, Cl. 164-416.000.
Thornton, Ian; DeWitt, Kenneth W.; and Robertson, Simon A., to Keebler Company. Method of preparing a biscuit or cookie product. 4,517,209, Cl. 426-383.000.
Tillyard, Malcolm: *See*—
Price, Frank C.; Tout, Nigel R.; Hanson, Raymond; and Tillyard, Malcolm, 4,517,442, Cl. 219-215.000.
Tinson, Christopher M.: *See*—
Wood, John; Tinson, Christopher M.; and Jenkins, Stuart M., 4,516,899, Cl. 414-330.000.
Titus, Charles H.; and Wittle, John K., to Electro-Petroleum, Inc. Tubular member. 4,516,608, Cl. 138-140.000.
TMC Corporation: *See*—
Riss, Wilfried; Nitschko, Theodor; Spitaler, Engelbert; and Oberleitner, Gerhard, 4,516,791, Cl. 280-612.000.
Tobiasz, Chester C.: *See*—
Poran, Michael; Langner, Carl; and Tobiasz, Chester C., 4,516,624, Cl. 164-418.000.
Tobita, Katsumi, to Alps Electric Co., Ltd. Pay television channel selector. 4,517,595, Cl. 358-114.000.
Toko, Inc.: *See*—
Sakai, Koichi, 4,517,508, Cl. 323-352.000.
Tokumaru, Hisashi, to Minolta Camera Kabushiki Kaisha. Zoom lens system. 4,516,839, Cl. 350-426.000.
Tokunaga, Toshio: *See*—
Takeshita, Masaru; Tokunaga, Toshio; and Ogawa, Yuichiro, 4,516,451, Cl. 83-171.000.
Tokuyama Sekisui Kogyo Kabushiki Kaisha: *See*—
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Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Ando, Hideo, 4,517,666, Cl. 369-45.000.
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Kashihara, Tomio; Tsurata, Toshiro; Yamaguchi, Masayoshi; Yokoi, Kiyotachi; and Suzuki, Etsuji, 4,516,673, Cl. 198-341.000.
Kobayashi, Yoshikata, 4,516,472, Cl. 91-392.000.
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Matsushima, Kazufumi, 4,517,428, Cl. 219-10.55B.
Miyauchi, Masami; and Itoh, Masayuki, 4,517,158, Cl. 420-584.000.
Morishita, Tatsuo; Funakoshi, Fumio; Nakamura, Kenichi; and Takamori, Kazuo, 4,517,564, Cl. 340-825.690.
Nagashima, Masayoshi; and Yamane, Hiroshi, 4,517,590, Cl. 358-75.000.
Nagashima, Masayoshi; Yamane, Hiroshi; and Yamashita, Mitsuo, 4,517,591, Cl. 358-75.000.
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Takaoka, Takashi; Mochizuki, Masahiko; Yamashita, Mitsuo; and Miura, Tadao, 4,517,668, Cl. 369-111.000.
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Uchino, Hiroshi; Nakajima, Kihei; and Kurosawa, Ryoichi, 4,517,636, Cl. 363-138.000.
Yamauchi, Masahide; and Fukatsu, Kunio, 4,516,866, Cl. 400-25.000.
Yamauchi, Toshiaki; Hibi, Tsuneo; Sasano, Kiyomi; and Hayashi, Yoshiki, 4,516,331, Cl. 34-77.000.
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Tomalia, Donald A.; and Wilson, Larry R., to Dow Chemical Company, The. Cyclic peptides. 4,517,122, Cl. 260-239.30R.

Toman, George M.: *See*—
Bernstein, Benjamin T.; Bock, Thomas J.; Toman, George M.; and Bhatia, Chandrakant, 4,516,512, Cl. 112-165.000.

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Tomisawa, Yoshiaki; Kinoda, Seiji; Fujita, Eiji; Murata, Masanori; Takeuchi, Toshio; and Ogawa, Ken, to Hitachi Chemical Company, Ltd. Process for developing or peeling alkali-type photosensitive film and apparatus used therein. 4,517,282, Cl. 430-399.000.

Tomita, Masahiro: *See*—
Takeuchi, Yukihisa; and Tomita, Masahiro, 4,516,993, Cl. 55-283.000.

Tomita, Masayoshi, to Fujitsu Limited. Method for constructing delay circuits in a master slice IC. 4,516,312, Cl. 29-571.000.

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Topalian, Joan A.; and Izen, Ronald L. Support for a premature infant. 4,516,282, Cl. 5-72.000.

Toray Industries, Inc.: *See*—
Oka, Ken-ichiro; Mineo, Masatoshi; and Ono, Terumichi, 4,517,149, Cl. 264-210.800.
Sumida, Atsushi; Ozaki, Keiichiro; and Watanabe, Shizuo, 4,517,169, Cl. 423-447.400.

Toray Silicone Company, Ltd.: *See*—
Harashima, Asao; Nakamura, Takashi; and Kishimoto, Keiichi, 4,517,150, Cl. 264-300.000.
Mine, Katsutoshi; Suzuki, Toshio; and Hanada, Tsuneo, 4,517,238, Cl. 428-212.000.

Torning, Ralph R., to Safeway Products Inc. Heating shelf. 4,517,446, Cl. 219-386.000.

Totani, Nagao: *See*—
Muramatsu, Toshio; Totani, Nagao; and Mangold, Helmut K., 4,517,297, Cl. 435-128.000.

Tout, Nigel R.: *See*—
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Valasek, Miloslav; Langer, Frantisek; Hradek, Jaroslav; and Seeman, Jindrich, 4,517,457, Cl. 250-239.000.

Townsend, Ellsworth D., to Industrial Engraving and Manufacturing Corp. Turret arrangement for continuous web rewinder. 4,516,742, Cl. 242-64.000.

Townsend, Rodney: *See*—
Markham, Peter G.; Townsend, Rodney; and Davies, Jeffrey W., 4,517,177, Cl. 424-93.000.

Toyo Jozo Kabushiki Kaisha: *See*—
Sakakibara, Hideo; Awata, Masashi; Satoi, Shuzo; Mutoh, Naoki; Takada, Masaki; and Hayashi, Mitsuo, 4,517,296, Cl. 435-119.000.

Toyo Kohan Co., Ltd.: *See*—
Kanda, Katsumi; Okamura, Takaaki; Minamigi, Takashi; Inui, Tsuneo; and Kondo, Yoshikazu, 4,517,255, Cl. 428-626.000.

Toyo Rubber Chemical Industry Co., Ltd.: *See*—
Kumasaka, Sadao; Tada, Satomi; Horikoshi, Shigeo; Kamanaka, Tamaki; and Taniguchi, Hiroshi, 4,517,312, Cl. 521-47.000.

Toyo Seikan Kaisha, Limited: *See*—
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Toyomura, Shigeru: *See*—
Fushimoto, Hideo; Toyomura, Shigeru; Nishimuro, Yoshiaki; Asakura, Osamu; and Rachi, Masahiro, 4,517,660, Cl. 364-708.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Okumura, Takeshi; Nakanishi, Kiyoshi; and Nakajima, Mikio, 4,516,544, Cl. 123-188.00M.
Tanigawa, Kou; Masuda, Jiro; Nakamura, Kazumasa; and Hayashi, Kazuhiko, 4,516,652, Cl. 180-177.000.
Urushidani, Masahiro, 4,516,551, Cl. 123-407.000.
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Yamawaki, Takeshi; Saitou, Tatuya; and Sugimori, Sigemi, 4,516,804, Cl. 296-214.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
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Toyota Motor Corp.: *See*—
Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, 4,517,030, Cl. 148-6.15R.

TP Laboratories, Inc.: *See*—
Hall, Arthur B., 4,516,938, Cl. 433-215.000.

Trachte, Dietrich: *See*—
Fussner, Paul; Hofmann, Karl; Komaroff, Iwan; Itoh, Katsuoki; Seifert, Kurt; Trachte, Dietrich; Vogel, Wilhelm; and Vogtmann, Hans-Jorg, 4,516,729, Cl. 239-453.000.

Tracton, Arthur A.; and Guidice, John N., to National Starch and Chemical Corporation. Process for preparing fiberboard. 4,517,240, Cl. 428-326.000.

Trajin, Jean-Paul: *See*—
Muller, Bernard; Piat, Rene ; Rensing, Cornelis; and Trajin, Jean-Paul, 4,517,362, Cl. 546-7.000.

Trassare, Anthony, Jr.: *See*—
Wnuk, Paul A.; Hamilton, Thomas J.; Trassare, Anthony, Jr.; and Oliver, Michael J., 4,516,891, Cl. 410-154.000.

Tribble, Terry B. Dispenser for particulate material in measured quantities. 4,516,701, Cl. 222-361.000.

Trillich, Charles H.: *See*—
Christine, William C.; and Trillich, Charles H., 4,516,691, Cl. 222-83.500.

Trinity Foundation: *See*—
Christine, William C.; and Trillich, Charles H., 4,516,691, Cl. 222-83.500.

Trio Kabushiki Kaisha: *See*—
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Trombert, John F. Aperture wheel. 4,516,842, Cl. 354-4.000.

Tromp, Petrus J.: *See*—
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Trotin, Jean-Pierre: *See*—
Bourgeois, Serge; Carle, Jean-Franqois; Lochon, Henri; and Trotin, Jean-Pierre, 4,516,525, Cl. 118-688.000.

Troupel, Michel: *See*—
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Trustroke International, Inc.: *See*—
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TRW Inc.: *See*—
Drutchas, Gilbert H.; and Spencer, Phillip B., 4,516,918, Cl. 418-15.000.
Merz, Kenneth M., 4,517,545, Cl. 338-25.000.

Trzeciak, Arnold: *See*—
Felix, Arthur M.; Gillessen, Dieter; Lergier, William; Meienhofer, Johannes A.; and Trzeciak, Arnold, 4,517,119, Cl. 260-112.50R.

Tsuchihashi, Akira; and Teramoto, Kazuyoshi, to Hitachi, Ltd. Method for controlling an industrial robot. 4,517,653, Cl. 364-513.000.

Tsuji, Akira; Ito, Sadayuki; and Fujimoto, Kazumi, to Sony Coporation. Flexible magnetic disk cassette and a recording and/or reproducing apparatus for the same. 4,517,617, Cl. 360-133.000.

Tsuji, Masahiro: *See*—
Koyama, Hiroyasu; Tsuji, Masahiro; and Suzuki, Yoshikuni, 4,517,365, Cl. 546-142.000.

Tsujimura, Hideo: *See*—
Taguchi, Haruyoshi; Tsujimura, Hideo; and Imanishi, Masamichi, 4,516,687, Cl. 220-94.00R.

Tsukakoshi, Shosaku, to Oki Electric Industry Co., Ltd. Weighted capacitor analogue-digital converters. 4,517,549, Cl. 340-347.0AD.

Tsuka'a, Masaharu: *See*—
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.

Tsunekawa, Tokuichi: *See*—
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Tsuruta, Toshiro: *See*—
Kashihara, Tomio; Tsuruta, Toshiro; Yamaguchi, Masayoshi; Yokoi, Kiyotachi; and Suzuki, Etsuji, 4,516,673, Cl. 198-341.000.

Tsutsui, Eiji; Yoshioka, Masahiro; Murakami, Masahiro; and Iwao, Noriyuki, to Mita Industrial Co., Ltd. Cleaning device for an electrostatic photographic copying machine. 4,516,849, Cl. 355-15.000.

Tsutsui, Ichiro: *See*—
Yamada, Hisafumi; Saito, Junya; and Tsutsui, Ichiro, 4,517,601, Cl. 358-167.000.

Tsutsume, Shigeru: *See*—
Yoshida, Yoshiichi, 4,516,927, Cl. 425-549.000.

Tsutsumi, Shigeru. Hot tip bushing means for a synthetic resin injection molding machine. 4,517,453, Cl. 219-421.000.

Tsutsumi, Yoshio: *See*—
Sato, Yoshito; Yato, Tokuhiro; Maeo, Hidemi; and Tsutsumi, Yoshio, 4,516,469, Cl. 91-362.000.

Tubular Threading Incorporated: *See*—
Albert, Robert J., 4,516,306, Cl. 29-564.700.

Tufts, Wesley M., to Control Fluidics, Inc. Water saving toilet system. 4,516,280, Cl. 4-319.000.

Turi, Raymond A.; and Pfeifer, Robert F., to NCR Corporation. Unified CMOS/SNOS semiconductor fabrication process. 4,516,313, Cl. 29-571.000.

Turner, Frank E., to Burke Company, The. Concrete slab key joint forming strip and supporting stake therefor. 4,516,875, Cl. 404-50.000.

Turner, Gary B.: *See*—
Morel, Don L.; Gay, Robert R.; and Turner, Gary B., 4,517,403, Cl. 136-249.000.

Turner, Richard L.: *See*—
Leeper, Marvin A.; Turner, Richard L.; and Simpkins, Terry J., 4,516,805, Cl. 297-330.000.

Tyler, Derek E.: *See—*
Gaule, Gerhart K.; Yarwood, John C.; and Tyler, Derek E., 4,516,627, Cl. 164-467.000.
Yarwood, John C.; and Tyler, Derek E., 4,516,625, Cl. 164-454.000.
UBE Industries, Ltd.: *See—*
Kawahito, Takashi; Himukashi, Yoshinori; and Yamada, Tetsuo, 4,517,168, Cl. 423-344.000.
Ubukata, Susumu; Mizutani, Yasukazu; and Iyoda, Shozo, to Susumu Ubukata. Snap type thermally responsive switch device. 4,517,541, Cl. 337-89.000.
Uchida, Yukimasa, to Tokyo Shibaura Denki Kabushiki Kaisha. Semiconductor integrated circuit including a fuse element. 4,517,583, Cl. 357-41.000.
Uchimura, Toshio, to Kabushiki Kaisha Komatsu Seisakusho. Hydraulic winch control system. 4,516,755, Cl. 254-344.000.
Uchino, Hiroshi; Nakajima, Kihei; and Kurosawa, Ryoichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Inverter apparatus. 4,517,636, Cl. 363-138.000.
Uchiyama, Takashi: *See—*
Suzuki, Ryoichi; Matsumoto, Seiichi; Amikura, Takashi; Tsunekawa, Tokuichi; and Uchiyama, Takashi, 4,516,835, Cl. 350-336.000.
Ueda, Shigeki, to Matsushita Electric Industrial Co., Ltd. Safety device for a heating appliance. 4,517,431, Cl. 219-10.55B.
Ueda, Tomoyuki, to Asahi Yukizai Kogyo Co., Ltd. Anticorrosive butterfly valve. 4,516,597, Cl. 137-314.000.
Uekubo, Yasuhiro, to Mitsubishi Denki Kabushiki Kaisha. Protective relay system for a power system. 4,517,619, Cl. 361-64.000.
Ulug, Mehmet E., to General Electric Company. Preemptive bid communication system. 4,517,670, Cl. 370-85.000.
Umetsu, Yoshihiro; Muraishi, Masakazu; Ito, Osamu; and Kakeba, Masakatsu, to Nissan Motor Company, Limited. Seating position adjusting device for an automotive vehicle seat. 4,516,788, Cl. 280-6.00R.
Ungar, Israel S.; Scher, Herbert I.; and O'Neill, Nelson L., to Nevamar Corporation. Transfer coating of abrasion-resistant layers. 4,517,235, Cl. 428-148.000.
Unger, Goetz W., to Knoll International, Inc. Webbing tensioning method. 4,516,305, Cl. 29-448.000.
Uni-Cardan Aktiengesellschaft: *See—*
Krude, Werner, 4,516,959, Cl. 464-175.000.
Unibody Time Saver Corporation: *See—*
Reich, George, 4,516,423, Cl. 72-422.000.
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Jahier, Giovanni, 4,516,534, Cl. 122-15.000.
Union Carbide Corporation: *See—*
Acomb, Byron H., 4,516,595, Cl. 137-73.000.
Bailey, John C., 4,516,317, Cl. 29-623.500.
Chan, John K., 4,517,132, Cl. 260-465.00F.
Chao, Chien C.; and Sherman, John D., 4,516,566, Cl. 127-46.300.
Gardner, Hugh C.; Michno, Michael J., Jr.; and Brode, George L., 4,517,321, Cl. 523-400.000.
Kupcikevicius. Vytautas, 4,516,387, Cl. 53-530.000.
Prakash, Sri; and Snyder, William B., Jr., 4,517,155, Cl. 419-19.000.
Yerushalmy, Yosef; and Stokes, Larry W., 4,517,437, Cl. 219-121.0PP.
Union Oil Company of California: *See—*
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Ward, John W., 4,517,074, Cl. 208-111.000.
Union Special Corporation: *See—*
Bernstein, Benjamin T.; Bock, Thomas J.; Toman, George M.; and Bhatia, Chandrakant, 4,516,512, Cl. 112-165.000.
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United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
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Agriculture: *See—*
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Gelbwachs, Jerry A., 4,516,858, Cl. 356-437.000.
Gray, Roger P., Jr., 4,517,570, Cl. 343-372.000.
Heath, James E.; and Swenson, Hilmer W., 4,517,464, Cl. 250-370.000.
Kinney, Daniel C., 4,517,517, Cl. 324-433.000.
Willmore, Robert R., 4,517,568, Cl. 343-18.00E.
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Buckland, Bruce E., 4,516,274, Cl. 2-209.000.
Calcagno, Vincent J., Jr., 4,516,326, Cl. 33-169.00B.
Chang, Chin-An; Chang, Leroy L.; and Esaki, Leo, 4,517,047, Cl. 156-610.000.
Eyman, Ralph A., 4,516,499, Cl. 102-293.000.
Gerharz, Reinhold, 4,517,569, Cl. 343-18.00D.
Lance, Clyde E.; and Hutchison, Wanda S., 4,516,827, Cl. 350-96.150.
Stern, Richard A.; and Babbitt, Richard W., 4,517,536, Cl. 333-254.000.
Sweeney, Donald W.; Gallagher, Neal C.; and Christensen, Charles R., 4,516,743, Cl. 244-3.130.
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Swift, Gregory W.; Migliori, Albert; and Wheatley, John C., 4,516,632, Cl. 165-167.000.
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Cunningham, Robert E., 4,517,505, Cl. 318-611.000.
Outlaw, Ronald A.; and Baugh, Bill T., 4,516,435, Cl. 73-863.110.
Ruitberg, Arthur P.; and Young, Kenneth M., 4,517,472, Cl. 307-82.000.
Shlichta, Paul J., 4,517,048, Cl. 156-621.000.
Sydnor, Richard L., 4,517,530, Cl. 331-3.000.
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Liu, Yet-Zen; and Hong, Chi-Shain, 4,517,674, Cl. 372-45.000.
Reinitz, Karl; and Hart, Lynn, 4,517,515, Cl. 324-252.000.
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Claasen, Theodoor A. C. M.; Stienstra, Albert J.; and van Roermund, Arthur H. M., 4,517,655, Cl. 364-703.000.
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Usher, Peter P., to Metex Corporation. Method of producing high temperature composite seal. 4,516,782, Cl. 277-1.000.
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Tomalia, Donald A.; and Wilson, Larry R., 4,517,122, Cl. 260-239.30R.

Wilson, Patricia A.: *See*—
Dennis, Ulric E.; Hollenbeck, Dennis W.; Kirtland, John A.; Stackhouse, Kenneth B.; Wilson, Patricia A.; Hill, William D.; Akers, David D.; and Hill, Elmer D., 4,517,154, Cl. 376-259.000.

Wilson Tool Company: *See*—
Shuttleworth, Edwin T., 4,516,450, Cl. 83-146.000.

Wilson, William G. J.: *See*—
Brown, Christopher R.; Corrie, John D.; and Wilson, William G. J., 4,517,673, Cl. 371-36.000.

Winckler, Elmer, to McManus, James W.; and Backus, James. Hoisting apparatus and method for raising oil tubing. 4,516,637, Cl. 166-377.000.

Winogrocki, Ray F.; and DuRocher, Daniel J., to Essex Group, Inc. Lamp socket assembly for mounting on printed circuit board. 4,516,824, Cl. 339-126.00R.

Winter, Karl, to Rekuperator KG Dr.-Ing. Schack & Co. Method for the absorptive purification of a gas stream of vaporous or gaseous impurities. 4,516,985, Cl. 55-18.000.

Winter, Karl, to Rekuperator KG Dr.-Ing. Schack & Co. Method and apparatus for purifying a gas stream in a sorption filter. 4,516,988, Cl. 55-59.000.

Winter, William J., to USM Corporation. Roll cross-axis mechanism. 4,516,491, Cl. 100-158.00R.

Winthrop, Michael F. In circuit modification device for dual in line packaged components. 4,516,816, Cl. 339-17.0CF.

Witco Chemical Corporation: *See*—
Nance, Weldon B.; and Calkins, Jack M., 4,517,100, Cl. 252-8.50C.

Wittle, John K.: *See*—
Titus, Charles H.; and Wittle, John K., 4,516,608, Cl. 138-140.000.

Wlodarski, Antoine. Power-driven screwing tool for pressure vessel heads. 4,516,445, Cl. 81-57.360.

Wnuk, Paul A.; Hamilton, Thomas J.; Trassare, Anthony, Jr.; and Oliver, Michael J., to Down River International, Inc. Suspended type cellular void filler. 4,516,891, Cl. 410-154.000.

Wohl, Ronald A.: *See*—
Diamond, Julius; and Wohl, Ronald A., 4,517,310, Cl. 514-394.000.

Wolfel, Lee A., to AMP Incorporated. Round cable adaptor for modular plug. 4,516,822, Cl. 339-103.00M.

Wolff, Siegfried; Grewatta, Heinz; and Buder, Wolfgang, to Degussa Aktiengesellschaft. Process for vulcanization or cross-linking halogen containing rubbers in the presence of silicon containing isothiuronium compounds. 4,517,335, Cl. 524-552.000.

Wolff, Siegfried; and Tan, Ewe-Hong, to Degussa Aktiengesellschaft. Rubber mixtures giving reversion-free vulcanizates and process of vulcanization. 4,517,336, Cl. 524-571.000.

Wolters, Ernst: *See*—
Reske, Eckart; and Wolters, Ernst, 4,517,319, Cl. 523-200.000.

Wood, John; Tinson, Christopher M.; and Jenkins, Stuart M., to De La Rue Systems Limited. Sheet feeding apparatus. 4,516,899, Cl. 414-330.000.

Woodward, Antony I.; Clarke, David G.; and Shahaney, Sunil, to Wiggins Teape Group Limited, The. Papermaking of polyolefin coated supports by controlling streaming potential. 4,517,285, Cl. 430-538.000.

Woolvin, Samuel C. Security locking device for outdoor water faucets. 4,516,414, Cl. 70-164.000.

Worley, Arthur C., to Exxon Research and Engineering Co. Variable orifice valve assembly. 4,516,606, Cl. 137-625.300.

Worner, Gunter; Kosik, Franz; and Gosele, Hartmut, to Daimler-Benz Aktiengesellschaft. Installation for damping vibrations in the drive train of a motor vehicle. 4,516,955, Cl. 464-89.000.

Worns, John R., to Uniroyal, Inc. Photosensitive elastomeric polymer composition for flexographic printing plates - processable in semi-aqueous basic solution or solvent systems. 4,517,279, Cl. 430-286.000.

Wright, Raymond L., to Eastern Company, The. Combined resin-mechanical mine roof support anchor. 4,516,886, Cl. 405-261.000.

Wuchinich, David G., to Cooper LaserSonics, Inc. Method of use of an ultrasonic surgical pre-aspirator having a orifice by-pass. 4,516,398, Cl. 604-22.000.

Wuerzer, Bruno: *See*—
Becker, Rainer; Jahn, Dieter; Keil, Michael; Himmele, Walter; and Wuerzer, Bruno, 4,517,013, Cl. 71-98.000.

Wyatt, Kenneth L., to AT&T Technologies, Inc. Magnetically controlled wire tensioning device. 4,516,739, Cl. 242-155.00M.

Xerox Corporation: *See*—
Braun, Oskar J.; and Hubler, Lawrence C., 4,516,714, Cl. 227-78.000.
Gruber, Robert J.; Knapp, John F.; and Bolte, Steven B., 4,517,268, Cl. 430-39.000.
Meijer, Wilhelmus, 4,516,713, Cl. 227-2.000.
Sprague, Robert A., 4,517,667, Cl. 369-122.000.

Yackel, Walter C., Jr.; and Hebenstreit, William E., to A. E. Staley Manufacturing Company. Preparation of imitation foods of a tender texture from proteinaceous extrudates. 4,517,218, Cl. 426-656.000.

Yahara, Shigeo: *See*—
Koiso, Yasuhiko; Ohtsuka, Kenji; and Yahara, Shigeo, 4,516,564, Cl. 126-263.000.

Yahiro, Tetsuji: *See*—
Choushi, Masahiro; and Yahiro, Tetsuji, 4,516,546, Cl. 123-195.00A.

Yamada, Akio: *See*—
Aihara, Shigenobu; and Yamada, Akio, 4,517,527, Cl. 330-287.000.

Yamada, Hisafumi; Saito, Junya; and Tsutsui, Ichiro, to Sony Corporation. Power-responsive ghost cancelling system. 4,517,601, Cl. 358-167.000.

Yamada, Sachiko: *See*—
Takayama, Hiroaki; Yamada, Sachiko; Nakayama, Keiko; and Suda, Tatsuo, 4,517,125, Cl. 260-397.200.

Yamada, Tetsuo: *See*—
Kawahito, Takashi; Himukashi, Yoshinori; and Yamada, Tetsuo, 4,517,168, Cl. 423-344.000.

Yamaguchi, Hitohisa; Fuse, Kenichiro; and Yoshida, Takeshi, to Toyota Jidosha Kabushiki Kaisha. Vehicle body structure for preventing water suction into an air cleaner. 4,516,650, Cl. 180-68.300.

Yamaguchi, Ken, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle radiator. 4,516,630, Cl. 165-47.000.

Yamaguchi, Masayoshi: *See*—
Kashihara, Tomio; Tsuruta, Toshiro; Yamaguchi, Masayoshi; Yokoi, Kiyotachi; and Suzuki, Etsuji, 4,516,673, Cl. 198-341.000.

Yamakawa, Toshiro: *See*—
Honda, Nobuyasu; Yamakawa, Toshiro; and Ikeda, Toshimitsu, 4,517,274, Cl. 430-122.000.

Yamamoto, Kenichi: *See*—
Yoshioka, Takeo; Yamamoto, Kenichi; Fukagawa, Yasuo; Shimauchi, Yasutaka; and Ishikura, Tomoyuki, 4,517,127, Cl. 260-245.20T.

Yamamoto, Tsukasa; Mochizuki, Asao; Okita, Hiroshi; Miyawaki, Toshi; Shirogane, Yoshiji; and Mori, Kazuhiko, to Toyota Motor Corp.; and Nihon Parkerizing Co. Process for activating steel surface prior to phosphating treatment aqueous activating solution therefor. 4,517,030, Cl. 148-6.15R.

Yamanaka, Koichi; Gotoh, Tetsuro; Aoki, Masanori; Kataoka, Isao; and Nishiwaki, Shunro, to Ebara Corporation. Solids-liquid separator. 4,517,091, Cl. 210-512.100.

Yamane, Hiroshi: *See*—
Nagashima, Masayoshi; and Yamane, Hiroshi, 4,517,590, Cl. 358-75.000.
Nagashima, Masayoshi; Yamane, Hiroshi; and Yamashita, Mitsuo, 4,517,591, Cl. 358-75.000.

Yamaoka, Masayoshi: *See*—
Numata, Mitsuo; Minamida, Isao; Yamaoka, Masayoshi; Shiraishi, Mitsuru; and Miyawaki, Toshio, 4,517,361, Cl. 544-24.000.

Yamashita, Mitsuo: *See*—
Nagashima, Masayoshi; Yamane, Hiroshi; and Yamashita, Mitsuo, 4,517,591, Cl. 358-75.000.
Takaoka, Takashi; Mochizuki, Masahiko; Yamashita, Mitsuo; and Miura, Tadao, 4,517,668, Cl. 369-111.000.

Yamauchi, Masahide; and Fukatsu, Kunio, to Tokyo Shibaura Denki Kabushiki Kaisha. Printing apparatus. 4,516,866, Cl. 400-25.000.

Yamauchi, Toshiaki; Hibi, Tsuneo; Sasano, Kiyomi; and Hayashi, Yoshiki, to Tokyo Shibaura Denki Kabushiki Kaisha. Drying apparatus having recycle air path. 4,516,331, Cl. 34-77.000.

Yamawaki, Takeshi; Saitou, Tatuya; and Sugimori, Sigemi, to Toyota Jidosha Kabushiki Kaisha. Vehicle body ceiling seal construction. 4,516,804, Cl. 296-214.000.

Yamazaki, Akio: *See*—
Hirose, Haruomi; and Yamazaki, Akio, 4,516,348, Cl. 43-17.000.

Yamazaki, Hatsutaro: *See*—
Fujiwara, Hiroshi; Yamazaki, Hatsutaro; and Ozawa, Kazuo, 4,517,349, Cl. 526-313.000.

Yana, Masasumi, to Tokyo Shibaura Denki Kabushiki Kaisha. Thermal ink transfer printing apparatus. 4,517,573, Cl. 346-76.0PH.

Yanai, Tokiyoshi: *See*—
Morikawa, Kunihiko; Higuchi, Megumu; and Yanai, Tokiyoshi, 4,516,422, Cl. 72-377.000.

Yanaihara, Noboru; Sugiura, Nobuo; and Hiyama, Takashi, to Amano Pharmaceutical Co., Ltd; and Otsuka Pharmaceutical Co., Ltd. Peptides, process for preparing the same and psychodepressant compositions containing the same. 4,517,180, Cl. 514-16.000.

Yang, James H. C.; and Tomaszewski, Walter, to Firestone Tire & Rubber Company, The. Channel Connector. 4,516,874, Cl. 403-313.000.

Yang, Tai-Cheng; Rao, Krishna K.; and Huang, I-Der, to Exxon Research & Engineering Co. Process for the synthesis of carboxylic anhydrides using a vanadium, phosphorus oxygen containing catalyst composition. 4,517,371, Cl. 549-239.000.

Yarwood, John C.; and Tyler, Derek E., to Olin Corporation. Electromagnetic control system for casting thin strip. 4,516,625, Cl. 164-454.000.

Yarwood, John C.: *See*—
Gaule, Gerhart K.; Yarwood, John C.; and Tyler, Derek E., 4,516,627, Cl. 164-467.000.

Yasuda, Akira: *See*—
Takasaki, Junsuke; Sato, Hirotake; and Yasuda, Akira, 4,517,031, Cl. 148-12.00C.

Yasui, Hideo: *See*—
Mitani, Toragoro; Yasui, Hideo; and Morikawa, Hisashi, 4,517,344, Cl. 526-62.000.

Yasui, Toru; and Nakatsuji, Haruo, to Sharp Kabushiki Kaisha. Screening structure for a cathode ray tube display. 4,517,494, Cl. 315-85.000.

Yato, Tokuhiro: *See*—
Sato, Yoshito; Yato, Tokuhiro; Maeo, Hidemi; and Tsutsumi, Yoshio, 4,516,469, Cl. 91-362.000.

Yazaki Plastics Industries Co., Ltd.: *See*—
Masumoto, Kazuhiro; Fujimura, Mituaki; and Sawazaki, Masauki, 4,517,151, Cl. 264-540.000.

Yellowstone Ltd.: *See*—
Burton, Charles A.; and Banovic, Peter, 4,516,699, Cl. 222-591.000.

Yerushalmy, Yosef; and Stokes, Larry W., to Union Carbide Corporation. Gas shielded plasma arc torch and collet assembly. 4,517,437, Cl. 219-121.0PP.

Yip, Shu W., to Breville Holdings Pty. Limited. Extrusion dies. 4,516,926, Cl. 425-464.000.
Yissum Research Development Company of the Hebrew University of Jerusalem: *See—*
Baniel, Avraham M., 4,517,142, Cl. 264-22.000.
Yokoi, Kiyotachi: *See—*
Kashihara, Tomio; Tsuruta, Toshiro; Yamaguchi, Masayoshi; Yokoi, Kiyotachi; and Suzuki, Etsuji, 4,516,673, Cl. 198-341.000.
Yokomizo, Yoshikazu, to Canon Kabushiki Kaisha. Image signal processing apparatus. 4,517,605, Cl. 358-280.000.
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, to Canon Kabushiki Kaisha. Apparatus for processing video signals. 4,517,606, Cl. 358-280.000.
Yokota, Masahisa: *See—*
Katsumata, Tsutomu; and Yokota, Masahisa, 4,517,389, Cl. 568-804.000.
Yokoyama, Junichi: *See—*
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.
Yonezawa, Atsushi: *See—*
Nakamura, Ken; Nagai, Tadashi; Shioyama, Giichi; Matayoshi, Yutaka; Ohnishi, Eiichi; Yokoyama, Junichi; and Yonezawa, Atsushi, 4,517,134, Cl. 261-39.00A.
York, Billie M., Jr., to Alcon Laboratories, Inc. Method for lowering intraocular pressure using phenylimino-imidazoles. 4,517,199, Cl. 514-392.000.
Yoshida, Hiroshi; Akashi, Shunji; and Kuse, Kazuki, to Yoshida Kogyo K. K. Method and apparatus for applying reinforcing pieces to slide fastener chain. 4,516,304, Cl. 29-408.000.
Yoshida, Isamu: *See—*
Iwasa, Susumu; Yoshida, Isamu; and Kondo, Koichi, 4,517,290, Cl. 435-7.000.
Yoshida, Kazunori: *See—*
Mimura, Nobuharu; Yoshida, Kazunori; Kawabata, Susumu; and Hasegawa, Junzo, 4,516,611, Cl. 139-452.000.
Yoshida Kogyo K. K.: *See—*
Yoshida, Hiroshi; Akashi, Shunji; and Kuse, Kazuki, 4,516,304, Cl. 29-408.000.
Yoshida, Susumu: *See—*
Yuki, Katsumi; Yoshida, Susumu; Ozeki, Mineo; Miyazaki, Yasuyuki; and Kawamata, Masaru, 4,517,645, Cl. 364-424.000.
Yoshida, Tadashi: *See—*
Yokomizo, Yoshikazu; Shibata, Takehiko; Shimizu, Katsuichi; Miyagi, Ken; Suzuki, Akira; Yoshida, Tadashi; Tsukata, Masaharu; Murakami, Koichi; and Nagashima, Nao, 4,517,606, Cl. 358-280.000.
Yoshida, Takao: *See—*
Light, Kenneth K.; Schreiber, William L.; McGhie, Joseph A.; Schreck, Ronald P.; Yoshida, Takao; Schreiber, Loren B.; and Muralidhara, Ranya, 4,517,385, Cl. 568-386.000.
Yoshida, Takeshi: *See—*
Yamaguchi, Hitohisa; Fuse, Kenichiro; and Yoshida, Takeshi, 4,516,650, Cl. 180-68.300.
Yoshida, Yoshiichi, to Tsutsume, Shigeru; and Seiki Engineering & Research Co. Ltd. Pointed heat-generating device for molds of injection molding machines. 4,516,927, Cl. 425-549.000.
Yoshida, Yoshitaka: *See—*
Nakahara, Mitsuharu; Ishida, Tomio; Honjo, Norifumi; and Yoshida, Yoshitaka, 4,516,537, Cl. 123-48.0AA.
Yoshida, Yosuke, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece having address designation circuits of ROM and RAM. 4,516,862, Cl. 368-155.000.
Yoshihara, Toshiyuki: *See—*
Hirooka, Masaaki; Kubo, Keiji; and Yoshihara, Toshiyuki, 4,517,271, Cl. 430-94.000.
Yoshihiko, Ota, to Victor Company of Japan, Ltd. Video signal recording apparatus. 4,517,609, Cl. 360-22.000.
Yoshikawa, Akihisa: *See—*
Oueyama, Naotake; and Yoshikawa, Akihisa, 4,516,473, Cl. 91-462.000.
Yoshino Kogyosho Co., Ltd.: *See—*
Saito, Tadao; Kishi, Takao; and Kakuta, Yoshiyuki, 4,516,727, Cl. 239-333.000.
Yoshino, Tadashi; and Mamei, Masayuki, to Matsushita Electric Industrial Co., Ltd. Tape driving control apparatus. 4,516,740, Cl. 242-203.000.
Yoshioka, Masahiro: *See—*
Tsutsui, Eiji; Yoshioka, Masahiro; Murakami, Masahiro; and Iwao, Noriyuki, 4,516,849, Cl. 355-15.000.
Yoshioka, Takeo; Yamamoto, Kenichi; Fukagawa, Yasuo; Shimauchi, Yasutaka; and Ishikura, Tomoyuki, to Sanraku-Ocean Co., Ltd. β-Lactam derivatives and process for production thereof. 4,517,127, Cl. 260-245.20T.
Yoshizawa, Hiroshi: *See—*
Nishikawa, Masao; Aoki, Takashi; Sakai, Shinzo; and Yoshizawa, Hiroshi, 4,516,671, Cl. 192-.076.
Young, Kenneth M.: *See—*
Ruitberg, Arthur P.; and Young, Kenneth M., 4,517,472, Cl. 307-82.000.
Young, Robert R.: *See—*
English, William A.; and Young, Robert R., 4,516,916, Cl. 417-368.000.
Yugen-gaisha Koito-Denki: *See—*
Koito, Toshio; Koito, Tetsuo; and Koito, Miyoko, 4,516,586, Cl. 131-246.000.
Yugen-gaisha Koito-Seimitsu: *See—*
Koito, Toshio; Koito, Tetsuo; and Koito, Miyoko, 4,516,586, Cl. 131-246.000.
Yugen-gaisha Koito-Seisakusho: *See—*
Koito, Toshio; Koito, Tetsuo; and Koito, Miyoko, 4,516,586, Cl. 131-246.000.
Yugengaisha Kyowa Chuzosho: *See—*
Tadashi, Ii; and Saichi, Egusa, 4,517,018, Cl. 75-129.000.
Yuki, Katsumi; Yoshida, Susumu; Ozeki, Mineo; Miyazaki, Yasuyuki; and Kawamata, Masaru, to Kabushiki Kaisha Toyoda Jidoh Shokki Seisakusho; and Kabushiki Kaisha Meidensha. Control device for loading and unloading mechanism. 4,517,645, Cl. 364-424.000.
Yungclas, James A. Internal combustion engine with supercharger. 4,516,541, Cl. 123-70.00R.
Zahnradfabrik Friedrichshafen AG: *See—*
Merz, Johann, 4,516,784, Cl. 277-180.000.
Zaitsu, Osamu: *See—*
Shibaike, Narito; Minamide, Seiko; Kikuya, Satoshi; Terada, Hiroshi; and Zaitsu, Osamu, 4,517,613, Cl. 360-85.000.
Zanzottera, Daniele: *See—*
Mantellina, Calogero; and Zanzottera, Daniele, 4,517,681, Cl. 375-106.000.
Zbinden, Paul: *See—*
Habicht, Ernst; and Zbinden, Paul, 4,517,184, Cl. 514-212.000.
Zdanowski, Richard E.; and Owens, Joseph M., to Rohm and Haas Company. Floor polish composition having improved durability. 4,517,330, Cl. 524-408.000.
Zecher, Wilfried; Merten, Rudolf; and Dunwald, Willi, to Bayer Aktiengesellschaft. Process for preparation of hydantoin esters through a masked polyisocyanate-carbodiimide route. 4,517,353, Cl. 528-45.000.
Zeigner, Willard L.: *See—*
MacIntosh, John A.; and Zeigner, Willard L., 4,516,433, Cl. 73-861.050.
Zeitler, Louie, to Die-Matic Corporation. Mine roof bolt mounting assembly. 4,516,883, Cl. 405-260.000.
Zemco, Inc.: *See—*
MacIntosh, John A.; and Zeigner, Willard L., 4,516,433, Cl. 73-861.050.
Zenith Electronics Corporation: *See—*
Bretl, Wayne E., 4,517,533, Cl. 331-116.00R.
Deitch, Leonard; and Knowles, Terrance, 4,517,559, Cl. 340-712.000.
Zens, Albert P.: *See—*
Hill, Howard D.; and Zens, Albert P., 4,517,516, Cl. 324-318.000.
Ziegenbein, Botho: *See—*
Reiss, Harald; and Ziegenbein, Botho, 4,517,263, Cl. 429-120.000.
Zietek, Didier G.: *See—*
Bouiller, Jean G.; Delonge, Jean-Claude L.; Rigo, Marcel L. A.; and Zietek, Didier G., 4,516,910, Cl. 416-190.000.
Zimmermann, Horst: *See—*
Million, Karl; and Zimmermann, Horst, 4,517,434, Cl. 219-76.120.
Zoecon Corporation: *See—*
Baer, Ted A., 4,517,130, Cl. 260-465.00E.
Zorb, Larry D.; and Wicklund, L. Harvey, to Zorwick Corp. Meter pit mounted holder for a water flow control device. 4,516,794, Cl. 285-30.000.
Zortea, Michel: *See—*
Burget, Paul; and Zortea, Michel, 4,517,000, Cl. 65-178.000.
Zorwick Corp.: *See—*
Zorb, Larry D.; and Wicklund, L. Harvey, 4,516,794, Cl. 285-30.000.
ZSI, Inc.: *See—*
Sherman, Clarence A., 4,516,296, Cl. 24-279.000.
Zsitvay, John I.: *See—*
Johnson, Robert S.; Fletcher, Paul E.; Benjamin, William S.; and Zsitvay, John I., 4,516,287, Cl. 15-119.00A.
Zucchini, Umberto: *See—*
Cuffiani, Illaro; Longi, Paolo; Zucchini, Umberto; and Pennini, Gianni, 4,517,307, Cl. 502-119.000.
Zurger, Manfred: *See—*
Lynch, John; Naarmann, Herbert; Schulz, Gunther; Vyvial, Rudolf; Wallbillich, Gunter; and Zurger, Manfred, 4,517,277, Cl. 430-281.000.
Zwirn, Robert; Dragavon, Edward J.; and Smithgall, Brian, to Hughes Aircraft Company. Resolution enhancement and zoom by degradation estimates. 4,517,599, Cl. 358-166.000.
501 Binks Manufacturing Co.: *See—*
Cavanaugh, James E.; Hetherington, Robert D.; and Parmley, Thomas A., 4,516,725, Cl. 239-127.000.

# LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 14TH DAY OF MAY, 1985

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Atlantic Richfield Company: *See*—
Moskovich, Peter P., Re. 31,882, Cl. 141-5.000.

Berecki, William A.: *See*—
Bovenkerk, Harold P.; and Berecki, William A., Re. 31,883, Cl. 51-295.000.

Bovenkerk, Harold P.; and Berecki, William A., to General Electric Company. Resinoid grinding wheels containing nickel-coated cubic boron nitride particles. Re. 31,883, Cl. 51-295.000.

General Electric Company: *See*—
Bovenkerk, Harold P.; and Berecki, William A., Re. 31,883, Cl. 51-295.000.

Hansel, William B.; and Smith, Earl W., to Hunter Environmental Services, Inc. Method for leakage measurement. Re. 31,884, Cl. 73-49.200.

Hodgson, Martin E., to T. J. Smith & Nephew Limited. Moisture-vapor-permeable pressure-sensitive adhesive materials. Re. 31,886, Cl. 428-40.000.

Hodgson, Martin E., to T. J. Smith & Nephew Limited. Moisture-vapor-permeable pressure-sensitive adhesive materials. Re. 31,887, Cl. 428-355.000.

Hunter Environmental Services, Inc.: *See*—
Hansel, William B.; and Smith, Earl W., Re. 31,884, Cl. 73-49.200.

Kimberly-Clark Corporation: *See*—
Meitner, Gary H., Re. 31,885, Cl. 252-91.000.

Lindsey, Hiram E., Jr., to MWL Tool and Supply Company. Setting tools and liner hanger assembly. Re. 31,881, Cl. 166-212.000.

Meitner, Gary H., to Kimberly-Clark Corporation. Microfiber oil and water wipe. Re. 31,885, Cl. 252-91.000.

Moskovich, Peter P., to Atlantic Richfield Company. Liquid dispensing nozzle assembly and method of using same. Re. 31,882, Cl. 141-5.000.

MWL Tool and Supply Company: *See*—
Lindsey, Hiram E., Jr., Re. 31,881, Cl. 166-212.000.

Schroeder, Russell G., II: *See*—
Ward, Joseph W.; and Schroeder, Russell G., II, Re. 31,888, Cl. 355-14.00R.

Smith, Earl W.: *See*—
Hansel, William B.; and Smith, Earl W., Re. 31,884, Cl. 73-49.200.

T. J. Smith & Nephew Limited: *See*—
Hodgson, Martin E., Re. 31,886, Cl. 428-40.000.
Hodgson, Martin E., Re. 31,887, Cl. 428-355.000.

Ward, Joseph W.; and Schroeder, Russell G., II, to Xerox Corporation. Sensor controlling in computer fanfold reproduction. Re. 31,888, Cl. 355-14.00R.

Xerox Corporation: *See*—
Ward, Joseph W.; and Schroeder, Russell G., II, Re. 31,888, Cl. 355-14.00R.

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# LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Clarke, Peter A.: *See*—
Molins, Desmond W.; Hinchcliffe, Dennis; and Clarke, Peter A., B1 4,120,391, Cl. 198-347.000.

de Coster, Paul; and Simoens, Adrien. Neoregelia plant. B1 2,003,971, 5-14-85, Cl. Plt.-88.000.

deSilva, Dodwell P.: *See*—
Vasishth, Ramesh C.; and deSilva, Dodwell P., B1 4,276,329, Cl. 427-393.000.

Envirosol Systems International, Ltd.: *See*—
Vasishth, Ramesh C.; and deSilva, Dodwell P., B1 4,276,329, Cl. 427-393.000.

Hinchcliffe, Dennis: *See*—
Molins, Desmond W.; Hinchcliffe, Dennis; and Clarke, Peter A., B1 4,120,391, Cl. 198-347.000.

Huddle, Carl F., to Tension Structures Co. Vaulted membrane shelter. B1 4,034,772, 5-14-85, Cl. 135-119.000.

Lindahl, Bengt E., to Svensk Lasthantering, Bengt Lindahl AB. Liftihg loop. B1 4,232,619, 5-14-85, Cl. 112-417.000.

Molins, Desmond W.; Hinchcliffe, Dennis; and Clarke, Peter A., to Molins Limited. Conveyor systems for cigarettes and other rod-like articles. B1 4,120,391, 5-14-85, Cl. 198-347.000.

Molins Limited: *See*—
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Walpin, Arline; and Walpin, Lionel A., 278,775, Cl. D6-495.000.

Werman, Jonathan H., to Keds Corporation, The. Sport shoe. 278,757, 5-14-85, Cl. D2-309.000.

White, Jeffrey N.; Kosich, Milo R.; and Levenstein, Norman, to Audio-Technica, U.S. Loud speaker. 278,811, 5-14-85, Cl. D14-34.000.

Williams, John K., to British Telecommunications. Housing for a telephone handset. 278,815, 5-14-85, Cl. D14-63.000.

Williams, Richard E. Picture framing cutter. 278,792, 5-14-85, Cl. D8-98.000.

Winston, Edith. Weighted vest. 278,840, 5-14-85, Cl. D21-191.000.

Woodhall, Michael B., to Crosfield Electronics Limited. Page planning table with display monitor. 278,820, 5-14-85, Cl. D14-103.000.

Woodruff, Keith, to American Cyanamid Company. Insect feeding station or similar article. 278,842, 5-14-85, Cl. D22-19.000.

Yoneda, Yoshihide, to Maruzen Sewing Machine Co., Ltd. Overlock stitch sewing machine. 278,823, 5-14-85, Cl. D15-69.000.

# LIST OF PLANT PATENTEES

Armstrong Nurseries, Inc.: *See*—
Christensen, Jack E., 5,466, Cl. 15.000.
Feigel, John R.; and Christensen, Jack E., 5,467, Cl. 18.000.

Brooks, Lyle A., to Carlton Nursery Company, Inc. Pear tree. 5,468, 5-14-85, Cl. 36.000.

Carlton Nursery Company, Inc.: *See*—
Brooks, Lyle A., 5,468, Cl. 36.000.

Christensen, Jack E., to Armstrong Nurseries, Inc. Hybrid tea rose plant cv. Arosumo. 5,466, 5-14-85, Cl. 15.000.

Christensen, Jack E.: *See*—
Feigel, John R.; and Christensen, Jack E., 5,467, Cl. 18.000.

Feigel, John R.; and Christensen, Jack E., to Armstrong Nurseries, Inc. Rose cv. Arofeigel. 5,467, 5-14-85, Cl. 18.000.

Wates, Byron E. Privet plant. 5,469, 5-14-85, Cl. 54.000.

# CLASSIFICATION OF PATENTS

## ISSUED MAY 14, 1985

NOTE.—First number, class; second number, subclass; third number, patent number

### CLASS 2

| | |
|---|---|
| 2 | 4,516,273 |
| 209 | 4,516,274 |
| 308 | 4,516,275 |

### CLASS 3

| | |
|---|---|
| 1.91 | 4,516,276 |
| 1.913 | 4,516,277 |

### CLASS 4

| | |
|---|---|
| 191 | 4,516,278 |
| 235 | 4,516,279 |
| 319 | 4,516,280 |
| | 4,516,281 |

### CLASS 5

| | |
|---|---|
| 72 | 4,516,282 |

### CLASS 8

| | |
|---|---|
| 149.1 | 4,516,283 |
| 510 | 4,516,978 |
| 583 | 4,516,979 |

### CLASS 14

| | |
|---|---|
| 16.5 | 4,516,284 |

### CLASS 15

| | |
|---|---|
| 84 | 4,516,285 |
| 104.12 | 4,516,286 |
| 119 A | 4,516,287 |
| 250.04 | 4,516,288 |
| 410 | 4,516,289 |

### CLASS 17

| | |
|---|---|
| 11 | 4,516,290 |
| 32 | 4,516,291 |

### CLASS 19

| | |
|---|---|
| 112 | 4,516,292 |

### CLASS 24

| | |
|---|---|
| 16 PB | 4,516,293 |
| 41 | 4,516,294 |
| 136 R | 4,516,295 |
| 279 | 4,516,296 |
| 498 | 4,516,297 |

### CLASS 26

| | |
|---|---|
| 3 | 4,516,298 |

### CLASS 29

| | |
|---|---|
| 6 | 4,516,299 |
| 24.5 | 4,516,300 |
| 27 C | 4,516,301 |
| 156.8 R | 4,516,302 |
| 227 | 4,516,303 |
| 408 | 4,516,304 |
| 448 | 4,516,305 |
| 564 | 4,516,307 |
| | 4,516,308 |
| 564.4 | 4,516,309 |
| 564.7 | 4,516,306 |
| 566.3 | 4,516,310 |
| 568 | 4,516,311 |
| 571 | 4,516,312 |
| | 4,516,313 |
| 572 | 4,516,314 |
| 576 B | 4,516,315 |
| 576 W | 4,516,316 |
| 623.5 | 4,516,317 |
| 846 | 4,516,318 |
| 877 | 4,516,319 |

### CLASS 30

| | |
|---|---|
| 49 | 4,516,320 |
| 50 | 4,516,321 |
| 92 | 4,516,322 |
| 276 | 4,516,323 |
| 377 | 4,516,324 |

### CLASS 33

| | |
|---|---|
| 138 | 4,516,325 |
| 169 B | 4,516,326 |
| 169 R | 4,516,327 |
| 181 R | 4,516,328 |
| 366 | 4,516,329 |

### CLASS 34

| | |
|---|---|
| 23 | 4,516,330 |
| 77 | 4,516,331 |
| 79 | 4,516,332 |
| 92 | 4,516,333 |
| 124 | 4,516,334 |
| 133 | 4,516,335 |

### CLASS 36

| | |
|---|---|
| 7.1 R | 4,516,336 |
| 136 | 4,516,337 |

### CLASS 37

| | |
|---|---|
| 4 | 4,516,338 |
| 141 R | 4,516,339 |
| 142 A | 4,516,340 |

### CLASS 40

| | |
|---|---|
| 152 | 4,516,341 |
| 156 | 4,516,342 |
| 574 | 4,516,343 |
| 602 | 4,516,344 |

### CLASS 42

| | |
|---|---|
| 46 | 4,516,345 |
| 50 | 4,516,346 |

### CLASS 43

| | |
|---|---|
| 11 | 4,516,347 |
| 17 | 4,516,348 |
| 17.5 | 4,516,349 |
| 17.6 | 4,516,350 |
| 23 | 4,516,351 |
| 42.26 | 4,516,352 |

### CLASS 44

| | |
|---|---|
| 1 SR | 4,516,980 |
| 53 | 4,516,981 |
| 62 | 4,516,982 |

### CLASS 47

| | |
|---|---|
| 58 | 4,516,353 |

### CLASS 49

| | |
|---|---|
| 387 | 4,516,354 |
| 460 | 4,516,355 |
| 504 | 4,516,356 |

### CLASS 51

| | |
|---|---|
| 98 R | 4,516,357 |
| 119 | 4,516,358 |
| 295 | Re.31,883 |
| 349 | 4,516,359 |
| 384 | 4,516,360 |
| 392 | 4,516,361 |

### CLASS 52

| | |
|---|---|
| 75 | 4,516,362 |
| 90 | 4,516,363 |
| 98 | 4,516,364 |
| 170 | 4,516,365 |
| 173 DS | 4,516,366 |
| 182 | 4,516,367 |
| 190 | 4,516,368 |
| 204 | 4,516,369 |
| 245 | 4,516,370 |
| 269 | 4,516,371 |
| 309.12 | 4,516,372 |
| 387 | 4,516,373 |
| 404 | 4,516,374 |
| 581 | 4,516,375 |
| 648 | 4,516,376 |
| 660 | 4,516,377 |
| 704 | 4,516,378 |

### CLASS 53

| | |
|---|---|
| 138 A | 4,516,379 |
| 282 | 4,516,380 |
| 375 | 4,516,381 |
| | 4,516,382 |
| 410 | 4,516,383 |
| 459 | 4,516,384 |
| 504 | 4,516,385 |
| 520 | 4,516,386 |
| 530 | 4,516,387 |

### CLASS 55

| | |
|---|---|
| 16 | 4,516,984 |
| 18 | 4,516,985 |
| | 4,516,986 |
| 52 | 4,516,987 |
| 59 | 4,516,988 |
| 68 | 4,516,989 |
| 96 | 4,516,990 |
| 124 | 4,516,991 |
| 145 | 4,516,992 |
| 283 | 4,516,993 |
| 337 | 4,516,994 |

### CLASS 56

| | |
|---|---|
| 16.4 | 4,516,391 |
| | 4,516,392 |
| 249 | 4,516,388 |
| 341 | 4,516,389 |
| 364 | 4,516,390 |
| 400.2 | 4,516,393 |

### CLASS 57

| | |
|---|---|
| 234 | 4,516,394 |
| 237 | 4,516,395 |
| 407 | 4,516,396 |
| 417 | 4,516,397 |

### CLASS 60

| | |
|---|---|
| 351 | 4,516,399 |
| 535 | 4,516,400 |
| 602 | 4,516,401 |
| 656 | 4,516,402 |
| 667 | 4,516,403 |

### CLASS 62

| | |
|---|---|
| 45 | 4,516,404 |
| 55 | 4,516,405 |
| 183 | 4,516,406 |
| 238.6 | 4,516,407 |
| 238.7 | 4,516,408 |
| 457 | 4,516,409 |

### CLASS 65

| | |
|---|---|
| 1 | 4,516,995 |
| 3.43 | 4,516,996 |
| 106 | 4,516,997 |
| 108 | 4,516,998 |
| 116 | 4,516,999 |
| 178 | 4,517,000 |
| 273 | 4,517,001 |

### CLASS 66

| | |
|---|---|
| 14 | 4,516,410 |
| 64 | 4,516,411 |
| 78 | 4,516,412 |

### CLASS 68

| | |
|---|---|
| 5 C | 4,516,413 |

### CLASS 70

| | |
|---|---|
| 164 | 4,516,414 |
| 252 | 4,516,415 |
| 276 | 4,516,416 |
| 384 | 4,516,417 |
| 456 R | 4,516,418 |

### CLASS 71

| | |
|---|---|
| 28 | 4,517,002 |
| | 4,517,003 |
| | 4,517,004 |
| | 4,517,005 |
| | 4,517,007 |
| 64.11 | 4,517,006 |
| 77 | 4,517,008 |
| 90 | 4,517,009 |
| | 4,517,010 |
| 92 | 4,517,011 |
| 94 | 4,517,012 |
| 98 | 4,517,013 |

### CLASS 72

| | |
|---|---|
| 60 | 4,516,419 |
| 329 | 4,516,420 |
| 354 | 4,516,421 |
| 377 | 4,516,422 |
| 422 | 4,516,423 |

### CLASS 73

| | |
|---|---|
| 23 | 4,516,424 |
| 49.2 | Re.31,884 |
| 198 | 4,516,425 |
| 432 R | 4,516,426 |
| 505 | 4,516,427 |
| 585 | 4,516,428 |
| 638 | 4,516,429 |
| 727 | 4,516,430 |
| 826 | 4,516,431 |
| 861.04 | 4,516,432 |
| 861.05 | 4,516,433 |
| 861.64 | 4,516,434 |
| 863.11 | 4,516,435 |
| 863.85 | 4,516,436 |
| 864.22 | 4,516,437 |
| 864.44 | 4,516,438 |

### CLASS 74

| | |
|---|---|
| 470 | 4,516,439 |
| 493 | 4,516,440 |
| 501 R | 4,516,441 |
| 529 | 4,516,442 |
| 711 | 4,516,443 |
| 781 R | 4,516,444 |

### CLASS 75

| | |
|---|---|
| 3 | 4,517,014 |
| 12 | 4,517,015 |
| 28 | 4,517,016 |
| 123 B | 4,517,017 |
| 129 | 4,517,018 |
| 130 R | 4,517,019 |

### CLASS 81

| | |
|---|---|
| 20 | 4,516,615 |
| 57.36 | 4,516,445 |

### CLASS 82

| | |
|---|---|
| 38 A | 4,516,446 |

### CLASS 83

| | |
|---|---|
| 71 | 4,516,447 |
| 137 | 4,516,448 |
| 140 | 4,516,449 |
| 146 | 4,516,450 |
| 171 | 4,516,451 |
| 455 | 4,516,452 |
| 471.3 | 4,516,453 |
| 499 | 4,516,454 |
| 519 | 4,516,455 |
| 578 | 4,516,456 |
| 646 | 4,516,457 |
| 651.1 | 4,516,458 |
| 713 | 4,516,459 |
| 861 | 4,516,460 |
| 881 | 4,516,461 |

### CLASS 84

| | |
|---|---|
| 1.16 | 4,516,462 |
| 385 R | 4,516,463 |
| 387 R | 4,516,464 |
| 470 R | 4,516,465 |

### CLASS 89

| | |
|---|---|
| 145 | 4,516,466 |

### CLASS 91

| | |
|---|---|
| 31 | 4,516,467 |
| 169 | 4,516,468 |
| 362 | 4,516,469 |
| 374 | 4,516,470 |
| 375 A | 4,516,471 |
| 392 | 4,516,472 |
| 462 | 4,516,473 |
| 519 | 4,516,474 |

### CLASS 92

| | |
|---|---|
| 57 | 4,516,475 |
| 59 | 4,516,476 |
| 128 | 4,516,477 |
| 137 | 4,516,478 |
| 170 | 4,516,479 |
| 182 | 4,516,480 |
| 212 | 4,516,481 |

### CLASS 98

| | |
|---|---|
| 36 | 4,516,482 |
| 40.14 | 4,516,483 |

### CLASS 99

| | |
|---|---|
| 279 | 4,516,484 |
| 339 | 4,516,485 |
| 388 | 4,516,486 |
| 450.6 | 4,516,487 |

### CLASS PIt.

| | |
|---|---|
| 88 | B1 2,003,971 |

### CLASS 100

| | |
|---|---|
| 4 | 4,516,488 |
| 98 R | 4,516,489 |
| 107 | 4,516,490 |
| 158 R | 4,516,491 |
| 192 | 4,516,492 |

### CLASS 101

| | |
|---|---|
| 27 | 4,516,493 |
| 93.26 | 4,516,494 |
| 129 | 4,516,495 |
| 152 | 4,516,496 |
| 240 | 4,516,497 |
| 288 | 4,516,498 |

### CLASS 102

| | |
|---|---|
| 293 | 4,516,499 |
| 496 | 4,516,501 |
| 523 | 4,516,502 |

### CLASS 104

| | |
|---|---|
| 3 | 4,516,503 |
| 130 | 4,516,504 |
| 284 | 4,516,505 |

### CLASS 105

| | |
|---|---|
| 3 | 4,516,506 |
| 199 A | 4,516,507 |

### CLASS 106

| | |
|---|---|
| 100 | 4,517,020 |

### CLASS 108

| | |
|---|---|
| 7 | 4,516,508 |
| 147 | 4,516,509 |

### CLASS 110

| | |
|---|---|
| 346 | 4,516,510 |
| | 4,516,511 |

### CLASS 112

| | |
|---|---|
| 165 | 4,516,512 |
| 262.2 | 4,516,513 |
| 275 | 4,516,514 |
| 417 | B1 4,232,619 |

### CLASS 114

| | |
|---|---|
| 39 | 4,516,516 |
| 51 | 4,516,517 |
| 61 | 4,516,518 |
| 197 | 4,516,515 |
| 270 | 4,516,519 |

### CLASS 116

| | |
|---|---|
| 217 | 4,516,520 |

### CLASS 118

| | |
|---|---|
| 50 | 4,516,521 |
| 120 | 4,516,522 |
| 500 | 4,516,523 |
| 683 | 4,516,524 |
| 688 | 4,516,525 |
| 697 | 4,516,526 |
| 723 | 4,516,527 |

### CLASS 119

| | |
|---|---|
| 3 | 4,516,528 |
| 5 | 4,516,529 |
| 14.08 | 4,516,530 |
| 18 | 4,516,531 |
| 48 | 4,516,532 |
| 72 | 4,516,533 |

### CLASS 122

| | |
|---|---|
| 15 | 4,516,534 |

### CLASS 123

| | |
|---|---|
| 39 | 4,516,536 |
| 48 AA | 4,516,537 |
| 52 M | 4,516,538 |
| 53 R | 4,516,539 |
| 65 PE | 4,516,540 |
| 70 R | 4,516,541 |
| 90.16 | 4,516,542 |
| 179 H | 4,516,543 |
| 188 M | 4,516,544 |
| 192 R | 4,516,545 |
| 195 A | 4,516,546 |
| 198 A | 4,516,547 |
| 260 | 4,516,548 |
| 276 | 4,516,549 |
| 357 | 4,516,550 |
| 407 | 4,516,551 |
| 418 | 4,516,554 |
| 452 | 4,516,552 |
| 470 | 4,516,555 |
| 557 | 4,516,556 |
| 568 | 4,516,553 |
| 619 | 4,516,557 |
| 632 | 4,516,580 |
| 634 | 4,516,558 |
| | 4,516,559 |

### CLASS 125

| | |
|---|---|
| 15 | 4,516,560 |

### CLASS 126

| | |
|---|---|
| 25 B | 4,516,561 |
| 77 | 4,516,562 |
| 101 | 4,516,563 |
| 263 | 4,516,564 |
| 419 | 4,516,565 |

### CLASS 127

| | |
|---|---|
| 30 | 4,517,021 |
| 46.3 | 4,516,566 |
| 68 | 4,517,022 |

### CLASS 128

| | |
|---|---|
| 1 D | 4,516,567 |
| 1.1 | 4,516,535 |
| 70 | 4,516,568 |
| 92 BC | 4,516,569 |
| 130 | 4,516,570 |
| 132 R | 4,516,571 |
| 156 | 4,516,572 |
| 201.13 | 4,516,573 |
| 303.1 | 4,516,574 |
| 305 | 4,516,575 |
| 327 | 4,516,576 |
| 330 | 4,516,577 |
| 341 | 4,516,578 |
| 419 PG | 4,516,579 |
| 639 | 4,516,581 |
| 653 | 4,516,582 |
| 660 | 4,516,583 |
| 785 | 4,516,584 |

### CLASS 131

| | |
|---|---|
| 84.3 | 4,516,585 |
| 246 | 4,516,586 |
| 256 | 4,516,587 |
| 291 | 4,516,588 |
| 331 | 4,516,589 |
| 352 | 4,516,590 |

### CLASS 132

| | |
|---|---|
| 88.7 | 4,516,591 |

### CLASS 134

| | |
|---|---|
| 4 | 4,517,023 |
| 15 | 4,517,024 |
| 38 | 4,517,025 |
| 169 C | 4,516,592 |

### CLASS 135

| | |
|---|---|
| 119 | B1 4,034,772 |

### CLASS 136

| | |
|---|---|
| 249 | 4,517,403 |

### CLASS 137

| | |
|---|---|
| 15 | 4,516,593 |
| | 4,516,594 |
| 73 | 4,516,595 |
| 240 | 4,516,596 |
| 314 | 4,516,597 |
| 318 | 4,516,598 |
| 375 | 4,516,599 |
| 495 | 4,516,600 |
| 510 | 4,516,601 |
| 512.15 | 4,516,602 |
| 559 | 4,516,603 |
| 596.15 | 4,516,604 |
| | 4,516,605 |
| 625.3 | 4,516,606 |
| 637.4 | 4,516,607 |

### CLASS 138

| | |
|---|---|
| 140 | 4,516,608 |

### CLASS 139

| | |
|---|---|
| 383 R | 4,516,609 |
| 435 | 4,516,610 |
| 452 | 4,516,611 |

### CLASS 141

| | |
|---|---|
| 5 | Re.31,882 |

### CLASS 144

| | |
|---|---|
| 1 R | 4,516,612 |
| 208 E | 4,516,613 |
| 364 | 4,516,614 |

### CLASS 148

| | |
|---|---|
| 1.5 | 4,517,026 |
| 6.14 R | 4,517,028 |
| 6.15 R | 4,517,030 |
| 6.15 Z | 4,517,029 |
| 6.3 | 4,517,027 |
| 12 C | 4,517,031 |
| 111 | 4,517,032 |
| 432 | 4,517,033 |
| 439 | 4,517,034 |

### CLASS 149

| | |
|---|---|
| 19.92 | 4,517,035 |

**CLASS 150**

52 R 4,516,616

**CLASS 156**

64 4,517,036
89 4,517,037
98 4,517,038
149 4,517,039
153 4,517,040
155 4,517,041
164 4,517,042
196 4,517,043
277 4,517,044
345 4,517,045
500 4,517,046
610 4,517,047
621 4,517,048
622 4,517,049
643 4,517,050
644 4,517,051

**CLASS 157**

1 4,516,617

**CLASS 160**

120 4,516,618
135 4,516,619
351 4,516,620

**CLASS 162**

11 4,517,052
251 4,517,053
301 4,517,054
344 4,517,055
4,517,056

**CLASS 164**

339 4,516,621
416 4,516,622
4,516,623
418 4,516,624
454 4,516,625
461 4,516,626
467 4,516,627

**CLASS 165**

36 4,516,628
45 4,516,629
47 4,516,630
4,516,631
167 4,516,632

**CLASS 166**

69 4,516,633
120 4,516,634
212 Re.31,881
266 4,516,635
272 4,516,636
377 4,516,637

**CLASS 172**

22 4,516,638
99 4,516,639

**CLASS 173**

53 4,516,662

**CLASS 174**

47 4,517,404
68 B 4,517,405
72 B 4,517,406
73 R 4,517,407
153 G 4,517,408

**CLASS 175**

227 4,516,640
228 4,516,641
340 4,516,642

**CLASS 177**

1 4,516,643
25 4,516,644
147 4,516,645
211 4,516,646

**CLASS 179**

6.04 4,517,410
7 R 4,517,411
7.1 R 4,517,412
81 C 4,517,409
81 R 4,517,413
4,517,414
107 FD 4,517,415
115.5 PS 4,517,416
156 R 4,517,417
4,517,418
159 4,517,419
164 4,517,420

**CLASS 180**

2.2 4,516,647
6.66 4,516,648
9.1 4,516,649
68.3 4,516,650
127 4,516,651
177 4,516,652
199 4,516,653
255 4,516,654
321 4,516,655

**CLASS 181**

175 4,516,656
204 4,516,657
208 4,516,658
243 4,516,659
296 4,516,660

**CLASS 182**

82 4,516,661

**CLASS 187**

19 4,516,663
29 R 4,516,664
4,516,665

**CLASS 188**

73.38 4,516,666
82.34 4,516,667

**CLASS 190**

2 4,516,668

**CLASS 192**

3.58 4,516,669
48.8 4,516,670
076 4,516,671
107 C 4,516,672

**CLASS 198**

341 4,516,673
347 B1 4,120,391
617 4,516,674
654 4,516,675

**CLASS 200**

1 R 4,517,421
38 A 4,517,426
50 C 4,517,422
52 R 4,517,423
4,517,424
148 A 4,517,425

**CLASS 202**

205 4,517,057

**CLASS 204**

4 4,517,058
14.1 4,517,059
44 4,517,060
59 R 4,517,061
77 4,517,062
105 R 4,517,064
119 4,517,065
157.1 R 4,517,063
192 C 4,517,066
255 4,517,067
283 4,517,068
290 F 4,517,069
298 4,517,070
419 4,517,071

**CLASS 206**

226 4,516,676
394 4,516,677
444 4,516,678
459 4,516,679

**CLASS 208**

45 4,517,072
111 4,517,073
4,517,074
4,517,075
140 4,517,076
216 R 4,517,077

**CLASS 209**

127.3 4,517,078
452 4,517,079

**CLASS 210**

85 4,517,080
4,517,081
117 4,517,082
131 4,517,083
169 4,517,084
232 4,517,085
323.2 4,517,086
396 4,517,087
411 4,517,088
488 4,517,089
493.2 4,517,090
512.1 4,517,091
4,517,092
629 4,517,093
664 4,517,094
665 4,517,095
668 4,517,096
696 4,517,097
701 4,517,098
741 4,517,099

**CLASS 211**

59.1 4,516,681
4,516,682

**CLASS 215**

211 4,516,683
272 4,516,684

**CLASS 219**

10.51 4,517,427
10.55 B 4,517,428
4,517,429
4,517,430
4,517,431
10.55 F 4,517,432
75 4,517,433
76.12 4,517,434
89 4,517,435
121 LH 4,517,436
121 PP 4,517,437
125.12 4,517,438
130.33 4,517,439
145.1 4,517,440
146.23 4,517,441
215 4,517,442
4,517,443
216 4,517,444
297 4,517,445
386 4,517,446
388 4,517,447
4,517,448
413 4,517,452
421 4,517,453
455 4,517,454
549 4,517,449

**CLASS 220**

23.83 4,516,685
85 R 4,516,686
94 R 4,516,687
293 4,516,688
335 4,516,689

**CLASS 221**

233 4,516,690

**CLASS 222**

83.5 4,516,691
105 4,516,692
4,516,693
148 4,516,694
153 4,516,695
181 4,516,696
212 4,516,697
330 4,516,700
341 4,516,698
361 4,516,701
514 4,516,702
591 4,516,699

**CLASS 223**

39 4,516,703
111 4,516,704

**CLASS 224**

32 A 4,516,705
42.2 4,516,706
202 4,516,707
257 4,516,708
315 4,516,709
324 4,516,710

**CLASS 225**

20 4,516,711
96.5 4,516,712

**CLASS 227**

2 4,516,713
78 4,516,714

**CLASS 228**

208 4,516,715
263.15 4,516,716

**CLASS 229**

15 4,516,717
33 4,516,718

**CLASS 232**

1 D 4,516,719

**CLASS 235**

95 R 4,517,450
379 4,517,451
463 4,517,455

**CLASS 237**

8 R 4,516,720
69 4,516,721

**CLASS 239**

14 4,516,722
77 4,516,723
119 4,516,724
127 4,516,725
317 4,516,726
333 4,516,727
399 4,516,728
453 4,516,729
533.8 4,516,730

**CLASS 241**

24 4,516,731
4,516,732
79 4,516,733
283 4,516,734

**CLASS 242**

56 R 4,516,735
56.2 4,516,736
64 4,516,742
77 4,516,737
152.1 4,516,738
155 M 4,516,739
203 4,516,740
217 4,516,741

**CLASS 244**

3.13 4,516,743
17.17 4,516,744
134 A 4,516,745
170 4,516,746
204 4,516,747

**CLASS 248**

1 4,516,748
56 4,516,749
58 4,516,750
276 4,516,751

**CLASS 250**

226 4,517,456
239 4,517,457
252.1 4,517,460
253 4,517,458
261 4,517,459
282 4,517,461
286 4,517,462
327.2 4,517,463
370 4,517,464
492.2 4,517,465

**CLASS 251**

214 4,516,752
335 B 4,516,754
346 4,516,753

**CLASS 252**

8.5 C 4,517,100
8.55 D 4,517,101
8.55 R 4,517,102
28 4,517,103
51.5 A 4,517,104
56 R 4,517,105
79.4 4,517,106
91 Re.31,885
106 B1 4,367,157
108 4,517,107
135 4,517,109
162 4,517,108
180 4,517,110
186.25 4,517,111
315.2 4,517,112
353 4,517,113
389 R 4,517,114
400 R 4,517,115
500 4,517,116
511 4,517,117
513 4,517,118

**CLASS 254**

344 4,516,755

**CLASS 256**

1 4,516,756

**CLASS 260**

112.5 R 4,517,119
239 R 4,517,121
239.3 R 4,517,122
4,517,123
245.2 R 4,517,124
4,517,126
245.2 T 4,517,127
397.2 4,517,125
458 C 4,517,128
465 E 4,517,130
465 F 4,517,131
4,517,132
465 G 4,517,129
545 R 4,517,133

**CLASS 261**

39 A 4,517,134
104 4,517,135

**CLASS 264**

2.1 4,517,138
4,517,139
4,517,140
4.7 4,517,141
22 4,517,142
4,517,143
25 4,517,136
28 4,517,144
29.5 4,517,137
40.2 4,517,145
40.6 4,517,146
83 4,517,147
112 4,517,148
210.8 4,517,149
300 4,517,150
540 4,517,151

**CLASS 266**

245 4,516,757
263 4,516,758

**CLASS 270**

12 4,516,759
31 4,516,760
41 4,516,761

**CLASS 271**

11 4,516,762
4,516,763
34 4,516,764
95 4,516,765

**CLASS 272**

52 4,516,766
65 4,516,767
4,516,768

**CLASS 273**

1 B 4,516,769
11 R 4,516,770
26 R 4,516,771
4,516,772
32 A 4,516,773
67 B 4,516,774
80.3 4,516,778
89 4,516,775
146 4,516,776
148 B 4,516,777
186 C 4,516,779
202 4,516,780
373 4,516,781

**CLASS 277**

1 4,516,782
50 4,516,783
180 4,516,784
188 A 4,516,785

**CLASS 279**

1 SG 4,516,787
2 R 4,516,786

**CLASS 280**

6 R 4,516,788
160 4,516,789
502 4,516,790
612 4,516,791
625 4,516,792

**CLASS 283**

103 4,516,793

**CLASS 285**

30 4,516,794
315 4,516,795
321 4,516,796
405 4,516,797

**CLASS 290**

36 R 4,517,466
44 4,517,467
52 4,517,468

**CLASS 292**

169.13 4,516,798

**CLASS 294**

54.5 4,516,799
64.1 4,516,800
81.5 4,516,801

**CLASS 296**

98 4,516,802
107 4,516,803
214 4,516,804

**CLASS 297**

330 4,516,805
457 4,516,806

**CLASS 299**

1 4,516,807
39 4,516,808
43 4,516,809

**CLASS 303**

24 F 4,516,810

**CLASS 307**

10 LS 4,517,469
64 4,517,470
67 4,517,471
82 4,517,472
269 4,517,473
272 A 4,517,475
272 R 4,517,474
455 4,517,476

**CLASS 308**

3 R 4,516,811

**CLASS 310**

23 4,517,477
49 R 4,517,478
54 4,517,479
68 R 4,517,480
71 4,517,481
78 4,517,482
156 4,517,483
266 4,517,484
320 4,517,485
331 4,517,486

**CLASS 312**

12 4,516,812
323 4,516,813

**CLASS 313**

407 4,517,487
414 4,517,488
422 4,517,489
502 4,517,490
579 4,517,491
587 4,517,492

**CLASS 315**

73 4,517,493
85 4,517,494
111.21 4,517,495
227 R 4,517,496
241 R 4,517,497
323 4,517,498
362 4,517,499

**CLASS 318**

130 4,517,500
314 4,517,501
474 4,517,502
561 4,517,503
568 4,517,504
611 4,517,505
807 4,517,506

**CLASS 322**

28 4,517,507

**CLASS 323**

352 4,517,508
362 4,517,509

**CLASS 324**

52 4,517,510
4,517,511
73 R 4,517,512
117 R 4,517,513
207 4,517,514
252 4,517,515
318 4,517,516
433 4,517,517

**CLASS 328**

165 4,517,518

**CLASS 329**

126 4,517,519
145 4,517,520

**CLASS 330**

2 4,517,521
10 4,517,522
126 4,517,523
257 4,517,524
260 4,517,525
284 4,517,526
287 4,517,527
297 4,517,528

**CLASS 331**

1 A 4,517,529
3 4,517,530
14 4,517,531
57 4,517,532
116 R 4,517,533

**CLASS 333**

14 4,517,534
81 A 4,517,535
254 4,517,536

**CLASS 335**

187 4,517,537
272 4,517,538
302 4,517,539

**CLASS 336**

205 4,517,540

**CLASS 337**

89 4,517,541
92 4,517,542
140 4,517,543
164 4,517,544

**CLASS 338**

25 4,517,545
320 4,517,546

**CLASS 339**

7 4,516,814
14 R 4,516,815
17 CF 4,516,816
19 4,516,817

36 4,516,818
46 4,516,819
48 4,516,820
75 M 4,516,821
103 M 4,516,822
111 4,516,823
126 R 4,516,824
143 R 4,516,825

**CLASS 340**

59 4,517,547
310 R 4,517,548
347 AD 4,517,549
347 CC 4,517,550
347 DA 4,517,551
347 DD 4,517,552
365 S 4,517,553
514 4,517,554
522 4,517,555
528 4,517,556
540 4,517,557
700 4,517,558
712 4,517,559
790 4,517,560
825.07 4,517,561
4,517,562
825.54 4,517,563
825.69 4,517,564
995 4,517,565

**CLASS 343**

8 4,517,566
17.7 4,517,567
18 D 4,517,569
18 E 4,517,568
372 4,517,570
771 4,517,571
876 4,517,572

**CLASS 346**

76 PH 4,517,573
135.1 4,517,574
138 4,517,575
139 R 4,517,576
140 R 4,517,577
4,517,578
160 4,517,579
214 4,517,580

**CLASS 350**

96.15 4,516,827
96.16 4,516,828
96.20 4,516,829
96.22 4,516,830
96.23 4,516,831
96.24 4,516,832
96.31 4,516,826
162.12 4,516,833
335 4,516,834
336 4,516,835
4,516,836
347 V 4,516,837
358 4,516,838
426 4,516,839
515 4,516,840

**CLASS 354**

1 4,516,841
4 4,516,842
173.1 4,516,843
275 4,516,844
412 4,516,845
465 4,516,846

**CLASS 355**

3 CH 4,516,848
3 TR 4,516,847
14 R Re.31,888
15 4,516,849
4,516,850

**CLASS 356**

28 4,516,851
121 4,516,852
152 4,516,853
363 4,516,854
367 4,516,855
368 4,516,856
418 4,516,857
437 4,516,858

**CLASS 357**

30 4,517,581
38 4,517,582
41 4,517,583
80 4,517,584
81 4,517,585

**CLASS 358**

13 4,517,586
17 4,517,587
44 4,517,588
75 4,517,589
4,517,590
4,517,591
92 4,517,592
107 4,517,593
111 4,517,594
114 4,517,595
133 4,517,596
141 4,517,597
142 4,517,598
166 4,517,599
4,517,600
167 4,517,601
198 4,517,602
213 4,517,603
262 4,517,604
280 4,517,605
4,517,606
284 4,517,607
298 4,517,608

**CLASS 360**

22 4,517,609
24 4,517,610
33.1 4,517,611
67 4,517,612
85 4,517,613
4,517,614
108 4,517,615
126 4,517,616
133 4,517,617

**CLASS 361**

58 4,517,618
64 4,517,619
154 4,517,620
231 4,517,621
283 4,517,622
358 4,517,623
387 4,517,624
399 4,517,625
433 4,517,626

**CLASS 362**

156 4,517,627
186 4,517,628
267 4,517,629
268 4,517,630
346 4,517,631
389 4,517,632

**CLASS 363**

21 4,517,633
35 4,517,634
136 4,517,635
138 4,517,636

**CLASS 364**

4,517,637
146 4,517,638
186 4,517,639
200 4,517,640
4,517,641
4,517,642
4,517,643
4,517,644
424 4,517,645
424.1 4,517,646
426 4,517,647
431.01 4,517,648
472 4,517,649
478 4,517,650
479 4,517,651
513 4,517,652
4,517,653
521 4,517,654
703 4,517,655
708 4,517,660
900 4,517,656
4,517,657
4,517,658
4,517,659
4,517,661

**CLASS 365**

44 4,517,662
222 4,517,663

**CLASS 366**

77 4,516,859
287 4,516,860

**CLASS 367**

163 4,517,664
4,517,665

**CLASS 368**

120 4,516,861
155 4,516,862
157 4,516,863

**CLASS 369**

45 4,517,666
111 4,517,668
122 4,517,667

**CLASS 370**

82 4,517,669
85 4,517,670

**CLASS 371**

19 4,517,671
27 4,517,672
36 4,517,673

**CLASS 372**

45 4,517,674
53 4,517,675
89 4,517,676
99 4,517,677

**CLASS 373**

95 4,517,678

**CLASS 374**

130 4,516,864
172 4,516,865

**CLASS 375**

37 4,517,679
75 4,517,680
106 4,517,681
4,517,682
117 4,517,683

**CLASS 376**

252 4,517,152
253 4,517,153
259 4,517,154

**CLASS 377**

19 4,517,684

**CLASS 400**

25 4,516,866
175 4,516,867

**CLASS 401**

5 4,516,868
131 4,516,869
146 4,516,870

**CLASS 402**

79 4,516,871

**CLASS 403**

24 4,516,872
191 4,516,873
313 4,516,874

**CLASS 404**

50 4,516,875
60 4,516,876

**CLASS 405**

130 4,516,878
132 4,516,879
160 4,516,880
195 4,516,881
224 4,516,882
260 4,516,883
261 4,516,884
4,516,885
4,516,886

**CLASS 406**

63 4,516,887
182 4,516,888

**CLASS 408**

152 4,516,889
204 4,516,890

**CLASS 410**

154 4,516,891
155 4,516,892

**CLASS 411**

184 4,516,893

**CLASS 414**

5 4,516,894
43 4,516,895
180 4,516,897
309 4,516,898
330 4,516,899
417 4,516,900
458 4,516,901
480 4,516,902
491 4,516,903
517 4,516,904
620 4,516,905
740 4,516,896
786 4,516,906

**CLASS 415**

2 A 4,516,907
122 R 4,516,908

**CLASS 416**

134 A 4,516,909
190 4,516,910

**CLASS 417**

2 4,516,911
45 4,516,912
243 4,516,913
282 4,516,914
365 4,516,915
368 4,516,916
390 4,516,917

**CLASS 418**

15 4,516,918
23 4,516,919
4,516,920
141 4,516,921

**CLASS 419**

19 4,517,155

**CLASS 420**

463 4,517,156
490 4,517,157
584 4,517,158

**CLASS 422**

20 4,517,159
65 4,517,160
95 4,517,161
142 4,517,162

**CLASS 423**

75 4,517,163
184 4,517,164
244 4,517,165
245 4,517,167
344 4,517,168
447.4 4,517,169
474 4,517,166
573 R 4,517,170
648 R 4,517,171

**CLASS 424**

7.1 4,517,172
16 4,517,173
47 4,517,176
62 4,517,174
70 4,517,175
93 4,517,177
122 4,517,178

**CLASS 425**

113 4,516,922
289 4,516,923
434 4,516,924
463 4,516,925
464 4,516,926
549 4,516,927

**CLASS 426**

19 4,517,203
94 4,517,204
103 4,517,205
115 4,517,206
315 4,517,207
332 4,517,208
383 4,517,209
392 4,517,210
444 4,517,211
496 4,517,212
538 4,517,213
548 4,517,214
557 4,517,215
573 4,517,216
655 4,517,120
656 4,517,218

**CLASS 427**

8 4,517,219
4,517,220
4,517,221
30 4,517,222
39 4,517,223
64 4,517,224
89 4,517,225
90 4,517,226
96 4,517,227
370 4,517,228
383.9 4,517,229
393 B1 4,276,329

**CLASS 428**

17 4,517,230
35 4,517,231
40 Re.31,886
57 4,517,232
108 4,517,233
119 4,517,234
148 4,517,235
192 4,517,236
198 4,517,237
212 4,517,238
307.3 4,517,239
326 4,517,240
332 4,517,241
336 4,517,242
4,517,243
342 4,517,244
355 Re.31,887
367 4,517,245
407 4,517,246
421 4,517,247
457 4,517,248
463 4,517,249
483 4,517,250
542.8 4,517,251
553 4,517,252
620 4,517,253
626 4,517,254
4,517,255
629 4,517,256
632 4,517,217
694 4,517,257

**CLASS 429**

21 4,517,258
26 4,517,259
41 4,517,260
64 4,517,261
87 4,517,262
120 4,517,263
163 4,517,264
217 4,517,265

**CLASS 430**

2 4,517,266
3 4,517,267
39 4,517,268
57 4,517,269
58 4,517,270
94 4,517,271
110 4,517,272
111 4,517,273
122 4,517,274
165 4,517,275
192 4,517,276
281 4,517,277
286 4,517,278
4,517,279
321 4,517,280
322 4,517,281
399 4,517,282
512 4,517,283
538 4,517,285
562 4,517,286
591 4,517,284

**CLASS 431**

12 4,516,928
4,516,929
26 4,516,930
168 4,516,931
202 4,516,932
255 4,516,933

**CLASS 432**

30 4,516,934
247 4,516,935

**CLASS 433**

6 4,516,936
173 4,516,937
215 4,516,938

**CLASS 434**

114 4,516,939

**CLASS 435**

4 4,517,287
7 4,517,288
4,517,289
4,517,290
14 4,517,291
32 4,517,292
68 4,517,293
70 4,517,294
101 4,517,295
119 4,517,296
128 4,517,297
160 4,517,298
197 4,517,299
317 4,517,300

**CLASS 436**

14 4,517,301
180 4,517,302
501 4,517,303
518 4,517,304

**CLASS 440**

53 4,516,940
105 4,516,941

**CLASS 441**

5 4,516,942
35 4,516,943
40 4,516,944

**CLASS 445**

19 4,516,945

**CLASS 446**

46 4,516,946
4,516,947
4,516,948
95 4,516,949
222 4,516,950
297 4,516,951
338 4,516,952
427 4,516,953
444 4,516,954
461

**CLASS 464**

89 4,516,955
4,516,956
111 4,516,957
153 4,516,958
175 4,516,959

**CLASS 474**

49 4,516,960
80 4,516,961
112 4,516,962
245 4,516,963
4,516,964
4,516,965

**CLASS 494**

1 4,516,966

**CLASS 501**

89 4,517,305

**CLASS 502**

74 4,517,306
119 4,517,307
401 4,517,308

**CLASS 514**

12 4,517,181
16 4,517,180
183 4,517,183
184 4,517,194
212 4,517,184
232 4,517,185
249 4,517,179
250 4,517,187
255 4,517,186
259 4,517,189
300 4,517,190
4,517,191
345 4,517,192
371 4,517,196
376 4,517,197
4,517,309
392 4,517,199
394 4,517,188
4,517,310
400 4,517,198
413 4,517,182
4,517,195
455 4,517,200
462 4,517,311
471 4,517,193
521 4,517,201
530 4,517,202

**CLASS 521**

47 4,517,312
51 4,517,313
59 4,517,314
64 4,517,315
81 4,517,316
95 4,517,317

**CLASS 523**

126 4,517,318
200 4,517,319
215 4,517,320
400 4,517,321
501 4,517,322
514 4,517,323

**CLASS 524**

27 4,517,324
188 4,517,325
310 4,517,326
315 4,517,327
370 4,517,328
401 4,517,329
408 4,517,330
451 4,517,331
506 4,517,332
516 4,517,333
539 4,517,334
552 4,517,335
571 4,517,336
859 4,517,337

**CLASS 525**

54.11 4,517,338
85 4,517,339
113 4,517,340
152 4,517,341
431 4,517,342
488 4,517,343

**CLASS 526**

62 4,517,344
105 4,517,345
153 4,517,346
216 4,517,347
273 4,517,348
313 4,517,349
344.2 4,517,350

**CLASS 527**

312 4,517,351

**CLASS 528**

18 4,517,352
45 4,517,353
172 4,517,354

# CLASSIFICATION OF PATENTS

287 4,517,355
483 4,517,356

**CLASS 534**

605 4,517,357
608 4,517,358

**CLASS 536**

7.4 4,517,359
119 4,517,360

**CLASS 544**

24 4,517,361

**CLASS 546**

7 4,517,362
66 4,517,363
4,517,364
142 4,517,365
231 4,517,366
276 4,517,367
303 4,517,368
345 4,517,369

**CLASS 548**

217 4,517,370

**CLASS 549**

239 4,517,371
246 4,517,372
292 4,517,373
533 4,517,374

**CLASS 556**

463 4,517,375

**CLASS 560**

87 4,517,376
261 4,517,377

**CLASS 564**

160 4,517,378
193 4,517,379
206 4,517,380
207 4,517,381
267 4,517,382
443 4,517,383

**CLASS 568**

27 4,517,384
386 4,517,385
483 4,517,386
728 4,517,387
779 4,517,388
804 4,517,389
881 4,517,390
885 4,517,391
948 4,517,392
4,517,393
4,517,394

**CLASS 585**

259 4,517,395
415 4,517,396
428 4,517,397
500 4,517,398
533 4,517,399
638 4,517,400
645 4,517,401
820 4,517,402

**CLASS 604**

22 4,516,398
87 4,516,967
174 4,516,968
187 4,516,969
270 4,516,970
280 4,516,971
282 4,516,972
319 4,516,973
333 4,516,974
385 A 4,516,975
389 4,516,976
415 4,516,977

# CLASSIFICATION OF DESIGNS

D2— 36 278,755
244 278,756
309 278,757
314 278,758
320 278,759
278,760
381 278,761
394 278,762
D3— 71 278,763
D4— 101 278,764
D6— 333 278,766
335 278,767
414 278,768
278,769
423 278,770
426 278,771
278,772
452 278,765
462 278,773
484 278,774
495 278,775
500 278,776
534 278,777
278,778
596 278,779
D7— 13 278,780
278,781
278,782
278,783
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# CLASSIFICATION OF PLANTS

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# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)


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| 01 : 4,516,613 | 4,516,774 | 4,517,439 | 4,517,215 | 4,516,485 | 4,517,363 |
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| 4,517,414 | 4,516,793 | 4,517,486 | 4,517,446 | 4,516,540 | 4,517,602 |
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| 02 : 4,516,637 | 4,516,800 | 4,517,503 | 4,517,474 | 4,516,684 | 4,517,683 |
| 04 : 4,516,364 | 4,516,801 | 4,517,514 | 4,517,510 | 4,516,702 | 19 : 4,516,349 |
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| 4,516,749 | 4,516,832 | 4,517,535 | 4,517,656 | 4,516,753 | 4,516,670 |
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| 4,517,532 | 4,516,907 | 4,517,625 | 4,517,291 | 4,516,919 | 4,516,903 |
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| 4,516,438 | 4,517,154 | 4,516,491 | 4,517,040 | 4,517,479 | 4,517,235 |
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| 4,516,751 | 4,517,410 | 4,517,164 | 4,516,387 | 4,517,279 | 4,516,280 |
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| | | | | | | | | | | | |
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| | 4,516,436 | 29 : | 4,516,531 | 36 : | Re.31,888 | 38 : | 4,516,439 | 42 : | Re.31,884 | | 4,516,752 |
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| | 4,516,580 | | 4,516,947 | | 4,516,325 | 39 : | Re.31,883 | | 4,516,299 | | 4,516,795 |
| | 4,516,604 | | 4,517,264 | | 4,516,336 | | 4,516,279 | | 4,516,305 | | 4,516,880 |
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| | 4,517,637 | | 4,516,446 | | 4,516,656 | | 4,516,593 | | 4,516,885 | | 4,517,241 |
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| | 4,516,357 | | 4,516,697 | | 4,516,768 | | 4,516,676 | | 4,517,037 | | 4,517,459 |
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| | 4,516,539 | | 4,516,782 | | 4,516,825 | | 4,516,692 | | 4,517,159 | | 4,517,561 |
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| | 4,517,210 | | 4,517,186 | | 4,517,191 | | 4,517,069 | | 4,517,500 | | 4,517,567 |
| | 4,517,223 | | 4,517,195 | | 4,517,192 | | 4,517,115 | 45 : | 4,516,289 | | 4,517,638 |
| | 4,517,237 | | 4,517,200 | | 4,517,268 | | 4,517,120 | | 4,516,292 | 53 : | 4,516,287 |
| | 4,517,249 | | 4,517,206 | | 4,517,272 | | 4,517,222 | | 4,516,595 | | 4,516,506 |
| | 4,517,261 | | 4,517,213 | | 4,517,302 | | 4,517,230 | | 4,516,609 | | 4,516,575 |
| | 4,517,368 | | 4,517,231 | | 4,517,339 | | 4,517,232 | | 4,516,626 | | 4,516,612 |
| | 4,517,383 | | 4,517,240 | | 4,517,341 | | 4,517,236 | | 4,516,667 | | 4,516,616 |
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| | 4,516,386 | | 4,517,351 | | 4,517,526 | | 4,517,492 | 47 : | 4,517,420 | | 4,517,639 |
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| | 4,517,041 | | 4,517,542 | | 4,516,585 | | 4,517,401 | | 4,516,517 | | 4,517,056 |
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| 06 : | 278,766 | 08 : | 278,761 | 25 : | 278,757 | | 278,814 | | 278,787 | | 278,793 |
| | 278,768 | | 278,824 | | 278,795 | | 278,842 | | 278,788 | | 278,806 |
| | 278,769 | 09 : | 278,835 | | 278,798 | | 278,844 | | 278,800 | | 278,808 |
| | 278,775 | 12 : | 278,792 | 26 : | 278,756 | 36 : | 278,755 | | 278,810 | | 278,811 |
| | 278,791 | | 278,812 | 27 : | 278,836 | | 278,762 | | 278,833 | 42 : | 278,774 |
| | 278,796 | 13 : | 278,799 | 28 : | 278,845 | | 278,780 | | 278,839 | | 278,816 |
| | 278,797 | | 278,822 | | 278,846 | | 278,781 | | 278,840 | | 278,831 |
| | 278,801 | 17 : | 278,789 | 29 : | 278,841 | | 278,782 | | 278,847 | 51 : | 278,765 |
| | 278,802 | | 278,819 | 33 : | 278,759 | | 278,783 | | 278,848 | | 278,777 |
| | 278,803 | 18 : | 278,778 | | 278,760 | | 278,784 | 37 : | 278,779 | 55 : | 278,767 |
| | 278,807 | 21 : | 278,763 | 34 : | 278,773 | | 278,785 | | | | |

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## CHANGE OF ADDRESS FORM

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Donald J. Quigg, *Acting Commissioner*